Master Thesis

Covid-19 and Global Supply Chain Adaptation: An Analysis of The European Alcoholic Beverage Industry

4th Semester Project
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Abstract

The coronavirus pandemic has prompted a lot of research on the area of supply chain adaptation. Traditional supply chain management strategies have been tested and there has been several questions raised as to their efficiency in tackling exogenous shocks. This study adopts the Dynamic Capability theory as a perspective for analyzing how multi-national enterprises mainly in the alcoholic beverage industry adapted to the impacts of COVID-19. Using a thematic literature review approach, three elements – Sensing, Seizing and Transformation – were identified as building blocks for the conceptualization. The literature review also highlighted the need for some additional abilities (Agility, Viability and Visibility) to serve as drivers to the dynamic capabilities. A combination of netnographics, qualitative research and multiple case analysis was conducted on 8 MNEs in the alcoholic beverage industry to understand how their supply chains adapted to COVOD-19. The findings show that the strategies of most of the MNEs align with the conceptual framework of the study.

Chapter 1: Introduction

In today's competitive and globalized world, it is important that MNEs are able to quickly recognize and adapt to changes in their business environment, if they are to survive. Prior to the occurrence of the COVID-19 pandemic, the European Alcoholic Beverage Industry was already facing some challenges due to the downward trend in the demand of beer driven by the aging population as well as campaigns towards reducing alcohol consumption among younger age groups of the region. This was further exacerbated by government restrictions imposed to control the spread of the virus and the WHO entreating governments to put in place measures to restrict alcohol consumption.

This paper focuses on MNEs in the European Alcoholic Beverage Industry and adaptation strategies they employed to withstand supply chain disruptions using dynamic capabilities which is an extension of the resource-based view approach to dealing with external shocks. The theories considered coupled with the conceptual framework were tested on eight (8) internationally recognized European brewery companies which were still operational during the on-going pandemic.

The study adopted a multiple case netnographic approach using internal secondary data (2020 Annual Reports & ESG Reports, Company Websites) of 8 MNEs in the alcoholic beverage industry, to analyze how the supply chains adapted to the impact of the pandemic. To achieve this, the following section presents the background of the study and the research question. This is followed by a systematic review of literature on supply chains, exogenous events, and theories on adaptation strategies for supply chains and a conceptual framework. The subsequent chapter is

made of the methodology of the study. Chapter four presents secondary data obtained from the companies, A discussion of the various findings, conclusion and suggestions for further studies concludes the study.

1.1 Background of the Study

Over the years, there have been several phenomena occurring in the external environment of businesses that have impacted it either positively or negatively. The Coronavirus (COVID-19) pandemic is an excellent example of such phenomena. In Europe and the rest of the world industries requiring human interaction such as culture and creative, aerospace and manufacturing were most negatively impacted due to government restriction (DE VET, et al., 2021). On the other hand, industries such as retail were not adversely impacted.

At the peak of the pandemic, Moët Hennessy Louis Vuitton (LVMH), a well-known French luxury goods multinational corporation, repurposed their supply chain from producing perfumes to hand sanitizers. Also, Foxconn, a Taiwanese multinational electronics contract manufacturer, also started producing face masks (Betti & Heinzmann, 2020). This presents an interesting case for International Business scholars because it clearly illustrates how exogenous shocks can impact multinational enterprises (MNEs) and their supply chain partners worldwide (AlTakarli, 2020)

The world is now highly interconnected and globalized (AlTakarli, 2020), therefore events in one part of the world can adversely affect a firm's business activities in other parts of the world as clearly seen during the pandemic. Globalization has enabled the movement of people, goods, and services across international borders (Bird & Thomlinson, 2015). The most cited example is Apple

Incorporation. The company has suppliers from 49 countries according to their Supplier Responsibility Report (Apple Inc., 2020). Another is the brewery ABInBev which sources its raw materials from over 20,000 farmers across 13 countries and 5 continents (ANHEUSER-BUSCH INBEV, 2020)

The following sections briefly describe the nature of global supply chains, the pandemic, and its impact on MNEs. The problem formulation which comprises the problem statement and research questions follows this.

1.2 Global Supply Chains (GSCs)

The 1990s and 2000s saw a transformation in information and communications technology (ICT). That, coupled with reduced transportation costs and trade liberalization (Baldwin, 2010) brought about profound changes in how and where things are made. Companies that once engaged in all the various stages of production, began to disaggregate, and outsource some of their functions (Lund, et al., 2019).

In the twenty-first century companies have globalized some or all of their business activities and functions by offshoring or outsourcing into other countries resulting in a Global Supply Chain (GSC). GSCs are "networks that can span across multiple continents and countries for the purpose of sourcing and supplying goods and services. They involve the flow of information, processes and resources across the globe" (CIPS, 2020) This means that firms can now source their materials from different geographical areas, produce finished goods in one location and or distribute them globally (Drake, 2012) It is now conceivable to enjoy beer brewed in Denmark using barley sourced from Russia in a Ghanaian restaurant. As of 2017, intermediate products represent almost

half of world goods trade (UNCTAD, 2018). This accentuates the degree to which manufacturing, and services are now structured into extensive supply chains across countries and regions.

GSCs are a source of competitive advantage so there are various benefits of a business operating one. The main benefit is often reduced cost. By moving business activities such as R&D, design, manufacturing and packaging to different countries, multinational enterprises (MNEs) can capitalize on the best available human or physical resources in different countries, while to maintaining their competitiveness by enhancing productivity and minimizing costs (Nicita, et al., 2013). For enterprises in developing countries, GSCs enable manufacturers within the chain to access current managerial competencies, quality standards and technology, and to become more competitive. (Altenburg, 2000); (Tewari, 1998)

On the other hand, operating across national borders presents more complexities. The most obvious one is institutional differences stemming from differences in rules, regulations, and cultures between countries. There are also issues concerning currencies and exchange rates. (Carter & Vickery, 1989) Interconnectedness also means that happenings in one country can have ramifications for the entire GSC as seen during the pandemic. As (Barry, 2004) argues, "An enterprise may have lowest overall costs in a stable world environment but may also have the highest level of risk – if any one of the multiple controlling factors kink up an extended global supply chain". Companies that engage in outsourcing can also be negatively impacted by the activities of suppliers in their supply chain (Heide, et al., 2014). For example, 1,110 factory workers were killed due to the collapse of the Rana Plaza building in Bangladesh. The scrutiny from the media, consumers, and activists was more focused on the global retailers that sourced from them and not on the suppliers who used the building (Greenhouse, 2013)

1.2.1 The Nature of GSCs

According to (Lall, et al., 3025), GSCs have different structures depending on three main factors: (1) the geography and nature of linkages between tasks in the chain; (2) the distribution of power among lead firms (MNEs) and other actors in the chain; (3) the role of government institutions and policies in structuring business relationships and industrial location.

1.3 COVID-19 Pandemic

The COVID-19 pandemic which started as a health crisis in the latter part of 2019, was declared a pandemic in March 2020 by the (WHO, 2020) because of the enormity of its multi-dimensional impact on public health and the economy. The world was largely unprepared for a situation of this magnitude. In an effort to curb the spread of the virus, many governments instituted directives such as closing of borders, working from home where possible and social distancing (ILO, 2020). The world literally came to a standstill. While these directives were effective in slowing the spread of the virus, they were harmful to the economy because business activities were interrupted (Strange, 2020).

The COVID-19 virus shares some basic similarities to the Spanish flu of 1918, in that they are both respiratory diseases which are transmitted by contact, droplets and fomites (WHO, 2020). The Spanish flu lasted between February 1918 until April 1920 in three waves and is estimated to have killed between 50 to 100 million people (Patterson & Pyle, 1991). As of February 2021, there had been a second wave of the corona virus and the discovery of three variants of the disease originating from the United Kingdom, Brazil and South Africa (CDC, 2021) resulting in over 100 million infections worldwide (WHO, 2021).

1.3.1 Impact of the Pandemic

The public health implications of the pandemic put governments in a difficult position because they need to balance control the spread of the virus while saving the economy. Controlling the spread of infections is important to control the rate at which the virus mutates (Roberts, 2021) and ensures that the country's health systems are not overwhelmed.

The public health crisis also posed global economic and financial instability issues. The global economy shrank by 4.3% in 2020 sending millions into poverty (The World Bank, 2021). The impact on the economy could also be observed from the stock market as with other epidemics and terrorist attacks where panic among international investors resulted in a sharp panic-selling response (Burch, et al., 2016). The 2020 stock market crash, which has also been referred to as the 'Coronavirus Crash', that occurred between 20th February and 7th of April 2020 was the swiftest fall in global stock markets in financial history, since the Wall Street Crash of 1929. According to (Baker, et al., 2020), previous infectious disease outbreaks, including the Spanish Flu, have not impacted the stock market as fiercely as the COVID-19 pandemic.

No exogenous shock has simultaneously affected numerous industries, causing massive layoffs and closures like the ongoing pandemic (Norris, et al., 2021). Businesses that were offering non-essential goods and services had to cease operations temporarily. Some employees, mostly in white collar jobs, were able to work from home using communication and collaborative tools (Godderis, 2020). However, this was largely impossible for workers in sectors that require face to face interaction such as food and hospitality, and wholesale and retail trade of non-essential goods and services (Brussevich, 2020).

To cope with the “new normal” (lockdowns and social distancing), some companies repurposed their supply chain to produce personal protective equipment and other essentials needed to fight the pandemic. For instance, Ford produced about 43,000 ventilators from its Ypsilanti, Michigan plant. General Motors also produced 30,000 ventilators (Drive, 2020).

However, the pandemic was not all bad for some businesses. COVID-19 augmented the growth of e-commerce (OECD, 2020). During the pandemic most people avoided going to brick and mortar stores perhaps in a bid to keep safe. Rather, online demand increased multiple categories, including entertainment and food and beverages delivered using innovative non-contact formats (Deloitte, 2020). Therefore, ecommerce businesses and other businesses with an online presence were not adversely affected. According to the (UNCTAD, 2021), Latin America’s online marketplace Mercado Libre, for example, sold twice as many items per day in the second quarter of 2020 compared with the same period the previous year. Jumia, an African e-commerce platform, reported a 50% jump in transactions during the first six months of 2020. China’s online share of retail sales rose from 19.4% to 24.6% between August 2019 and August 2020. In Kazakhstan, the online share of retail sales increased from 5% in 2019 to 9.4% in 2020. This is quite similar to what happened during the SARS crisis in 2003. It is generally known for starting up Alibaba’s and other Chinese companies’ e-commerce successes in Asia (Clark & Narrator, 2016).

Chapter 2: Problem Formulation

GSCs play a crucial role in the activities of MNEs. By their nature, they are spread across national borders however are highly interdependent. This means that challenges in any part of the supply

chain can slow down or halt activities across the entire supply chain. The ongoing pandemic has exposed certain vulnerabilities associated with GSCs. Measures instituted by various governments to help control the spread of the virus resulted in unintended consequences for GSCs and their activities. For most MNEs and those in the Alcoholic Beverage industry in particular, the effects were drastic.

The WHO advised that the consumption and access to alcohol be restricted during the pandemic (Europe, 2020). Alcohol consumption is related to many physical illnesses and mental illnesses which can make individuals susceptible to coronavirus. This is because alcohol raises the risk of developing certain diseases by impacting the immune system (Kamal, et al., 2017). Also, government policies to control the spread of the virus was contingent on social distancing and limiting the number of people per gathering (OECD, 2020). Parties, weddings, football match days and everything else was affected. This limited mobility and socialization and impacted patterns and places of alcohol consumption (OECD, 2020). The Alcoholic Beverage industry was severely hit especially on their on-trade front where they sold to bars, restaurants, hotels etc. because avenues that enabled alcohol consumption, had to be closed. A cross sectional study conducted across 21 European countries by (Kilian, et al., 2021) found that there was a decrease in alcohol use. This transferred to a disruption in the supply chain of the companies.

These government policies had similar effects on all companies and not just the alcoholic beverage industry. Governments encouraged companies to re-evaluate international outsourcing approaches to pre-empt future supply chain hold ups with the intention of improving resilience (Seric, et al., 2020). The (Economist, 2020) Economist stated that India, Japan, America, and the European

Union have expressed the desire to or taken steps to encourage local production. Alternatively, MNEs could also diversify geographically to reduce exposure to location-specific shocks and reduce costs to be able to deal better with crises (OECD, 2020). These current happenings coupled with the uncertainty associated with the pandemic due to lack of information have given rise to various predictions about the future of GSC activities.

Notwithstanding the severe impact expected on the beverage industry, most companies reported positive financial results than would have been expected (IWSR, 2020). A surprising outcome considering the negative impact the pandemic has had on the hospitality industry. This creates a curious case to figure out how the supply chain of the alcoholic beverage industry was able to adapt to this event. The corona pandemic has been and is still a complicated phenomenon.

One of the reasons why the pandemic and its ripple effects were so catastrophic was because governments and businesses were unprepared for it. When it began in December 2019, nobody expected it to spread so quickly across the globe and simultaneously become a public health and an economic crisis. It could be described as an event which had a low probability of occurring but with devastatingly high impact. These kinds of events are difficult to predict. Therefore, there is a need for MNEs to be prepared to mitigate the uncertainty and impacts of such events.

Change is required for survival in the context of uncertainty (Dopson & Neumann, 1998). The aim of this research is therefore to explore and understand how exogenous shocks (using the COVID-19 pandemic as a case study) impacted on the Global Supply Chains of the Alcoholic Beverage Industry and some of the adaptation strategies that MNEs in this industry adopted to survive and

remain competitive. To achieve the aim of the research, the following questions have been set up as guidelines to fulfil the research purpose.

2.1 Research question

How do European MNEs adapt to exogenous shocks (Covid-19) in order to maintain their supply chain activities?

This study will assess the impact of the pandemic on the business activities of MNEs in the European Alcoholic Beverage Industry, mainly on their supply chain lines and how they can remain operational by adopting techniques and strategies to mitigate such effects.

2.2 Justification/Contribution to Research

This study is relevant because as an ongoing event, the impact of the COVID-19 pandemic is still under research. This study will therefore set the stage for future research when the pandemic has ended. The impact of the pandemic was so devastating because businesses were largely unprepared for an event of such magnitude. The results of the study will therefore be relevant not only to MNEs in the European Alcoholic Beverage Industry but also to Small and Medium Size Enterprises (SMEs) since they usually have less capacity or resources to cope with extreme uncertainties. This study will further provide some guidance on how to navigate these uncertain times and future similar occurrences since the world is now highly interconnected through global supply chains making it a global village. Moreover, a look into supply chain and adaptation

strategies while taking into consideration exogenous shocks deviates from its traditionally known relationship to an organization's competitiveness.

This research also presents an opportunity to lay down strategies and techniques applicable on the supply chain management for MNEs in order to survive the impacts of pandemics rather than to compete. The research also allows us to appreciate the dynamic capability perspective as a lens for understanding supply chain adaptation. The theories on supply chain management and adaptation will present us with guidelines into developing a framework applicable in the European Alcoholic Beverage Industry. This can be further developed and made applicable into other industries similar to the aforementioned one. With this, organizations can well prepare and overcome the impacts of exogenous shocks during uncertain times.

Chapter 3: Literature Review

This chapter contains systematic literature review (SLR) of existing literature on exogenous shocks, global supply chain management, and organizational adaptation.

3.1 Choosing the Literature

The initial selection of studies was executed through *scopus.com* where the database provided most literature on the topic at hand. Scopus is essential for collecting data to VOSViewer, which is a software analytical tool utilized in this paper. Moreover, other scientific database such Science Direct (Elsevier), Emerald Insight (Emerald), Google Scholar, Wiley Online Library (Wiley) and Springer Link (Springer) were also accessed for some specific literature on the topic. After the

database selection, the researchers based on the VOSViewer data and their academic evaluation with regards to the research question.

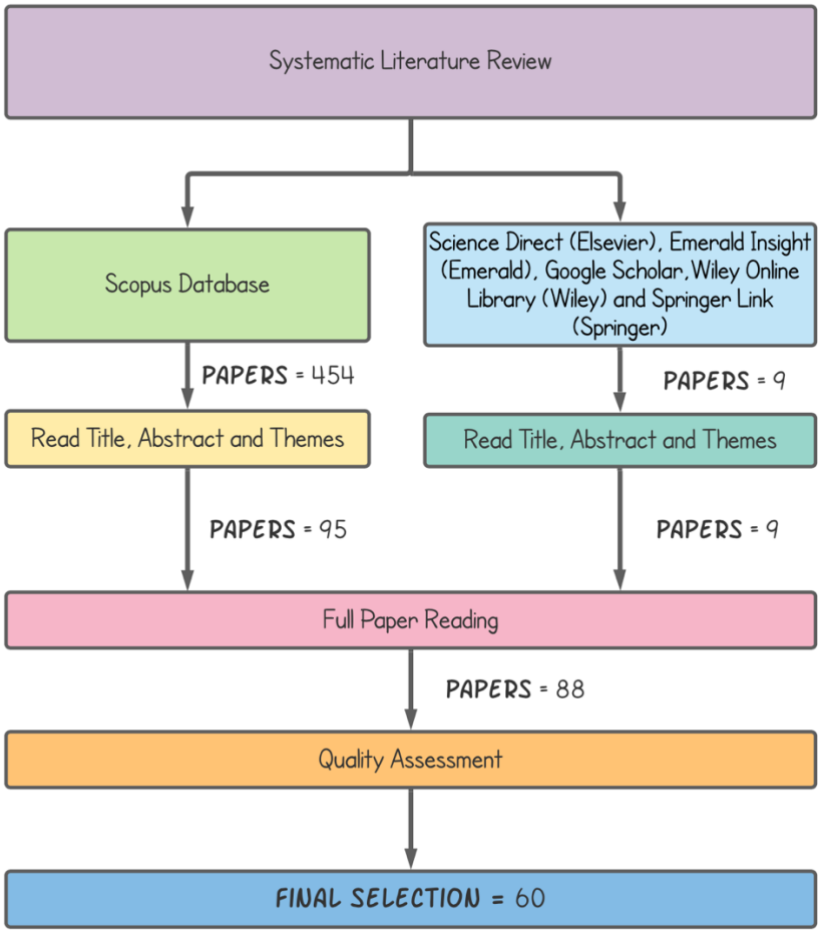


Figure 1 – structure of SLR

This literature review began with an unstructured brainstorming, where different keywords came up and were discussed as per our research question. The idea was to identify themes within the research area which had significant and direct influence on the topic. The research question, "*How do European MNEs adapt to exogenous shocks (Covid-19) in order to maintain their supply chain*

activities?", was then divided into sections to identify key themes within it. The division was as follows.

1. *MNEs' adaptation strategies.*
2. *Exogenous shocks in the form of pandemics.*
3. *Supply chain activities/management.*

The first section focuses on the strategies MNEs implemented in order to adapt. Our interest was to know the ideas and strategies which aided them to adapt, as such, "Adaptation" as a theme was chosen. The second section also focused on exogenous shocks but was narrowed down to "Pandemics" as a theme and not "COVID-19" due to the newness of the research area. "Supply chain" as a theme was chosen from the last section since it was our main subject of interest and analysis. As per our deductions, it was thereby agreed that the initial search criteria were "supply chain", "pandemic" and "adaptation".

Figure 2 – 1st Scopus search

The number of results for the first search on Scopus can be seen in *Figure 2* above. The search box iterated for the words “supply chain”, “pandemic” and “adaptation” either in the title, abstract or keywords of different articles. A result of 454 documents surfaced and the decision to maintain and work with this number of documents was finalized. However, an additional keyword (i.e., COVID-19) in conjunction with the initial keywords to expand our research literature was tested as well. This was done to further enquire if there exists any literature in the study area directly pertaining to the COVID-19. This surprisingly yielded only 20 documents as seen in *Figure 3* below. The search results were too small to be utilized in our research, as such we decided to stick with our initially searched keywords and results of 454 documents.

Figure 3 – 2nd Scopus search

3.2 VOSViewer

The agreed search on Scopus which yielded 454 documents was utilized for the research and further processed by introducing VOSViewer. VOSViewer is a software tool used to construct and visualize bibliographic data networks. These networks may include journals or researchers and will be constructed based on bibliographic coupling, citation, co-citation, or co-authorship relations. VOSViewer can also be utilized as a text mining tool, to construct and visualize networks of important terms within the scientific network.

Moreover, in this paper, a VOSViewer was used to create a map based on the bibliographic data in the 454 articles. In order to do this, the article's abstract and keywords were downloaded from Scopus, as *figure 4* below illustrates.

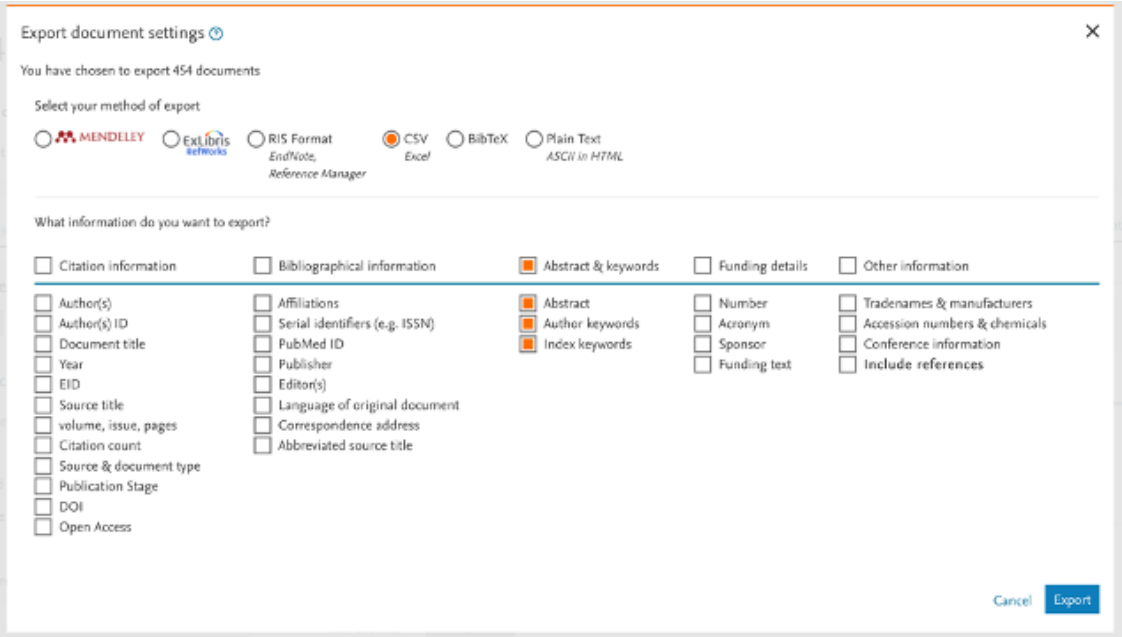
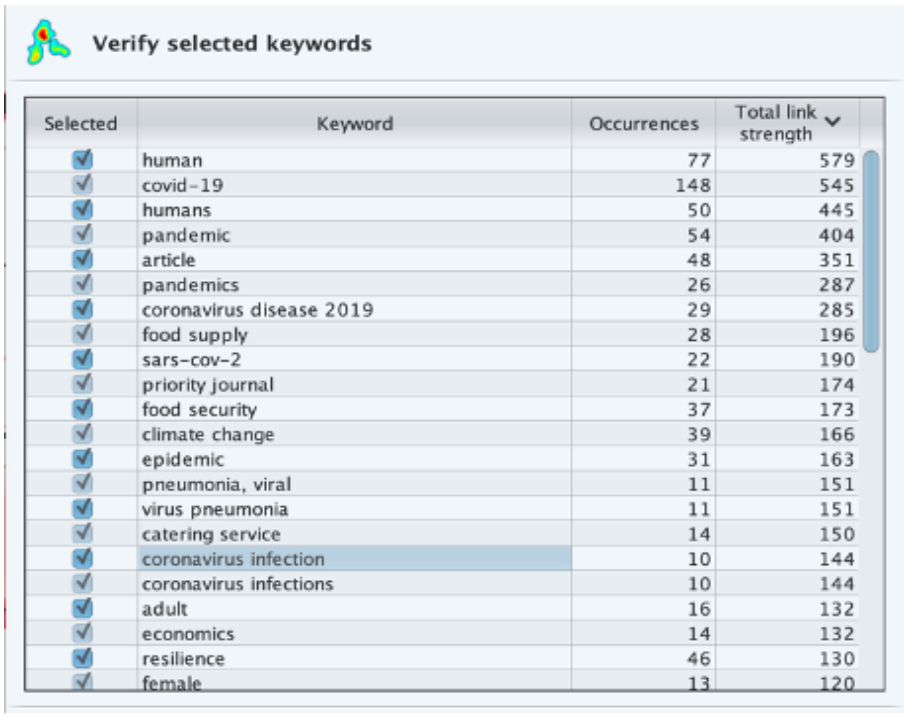


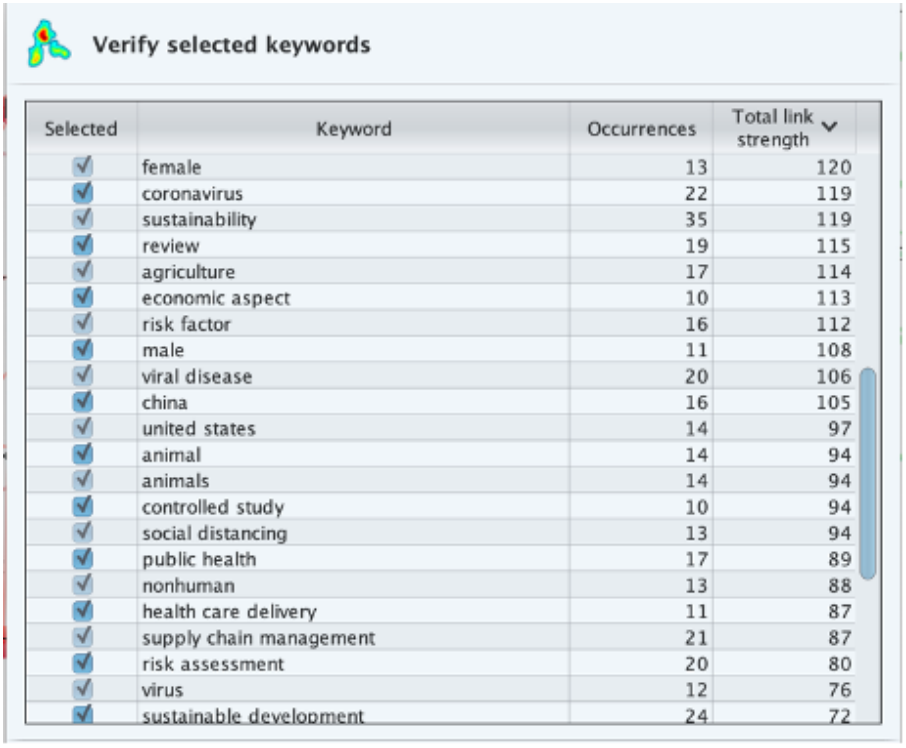
Figure 4 - Downloading abstract and keywords

The downloaded documents were converted into a csv. file, so as to be able to import them into the VOSViewer. The VOSViewer program then verified the number of occurrences for each keyword and the total link strength. The total number of keywords in the entire 454 documents were 3651 but after minimizing the number of occurrences to 10, only 57 of them met the threshold. For each of the 57 keywords, the total strength of the co-occurrence links with other keywords was calculated and the keywords with the greatest strength was selected, which showed the following data:



Verify selected keywords

Selected	Keyword	Occurrences	Total link strength
☑	human	77	579
☑	covid-19	148	545
☑	humans	50	445
☑	pandemic	54	404
☑	article	48	351
☑	pandemics	26	287
☑	coronavirus disease 2019	29	285
☑	food supply	28	196
☑	sars-cov-2	22	190
☑	priority journal	21	174
☑	food security	37	173
☑	climate change	39	166
☑	epidemic	31	163
☑	pneumonia, viral	11	151
☑	virus pneumonia	11	151
☑	catering service	14	150
☑	coronavirus infection	10	144
☑	coronavirus infections	10	144
☑	adult	16	132
☑	economics	14	132
☑	resilience	46	130
☑	female	13	120



Verify selected keywords

Selected	Keyword	Occurrences	Total link strength
☑	female	13	120
☑	coronavirus	22	119
☑	sustainability	35	119
☑	review	19	115
☑	agriculture	17	114
☑	economic aspect	10	113
☑	risk factor	16	112
☑	male	11	108
☑	viral disease	20	106
☑	china	16	105
☑	united states	14	97
☑	animal	14	94
☑	animals	14	94
☑	controlled study	10	94
☑	social distancing	13	94
☑	public health	17	89
☑	nonhuman	13	88
☑	health care delivery	11	87
☑	supply chain management	21	87
☑	risk assessment	20	80
☑	virus	12	76
☑	sustainable development	24	72

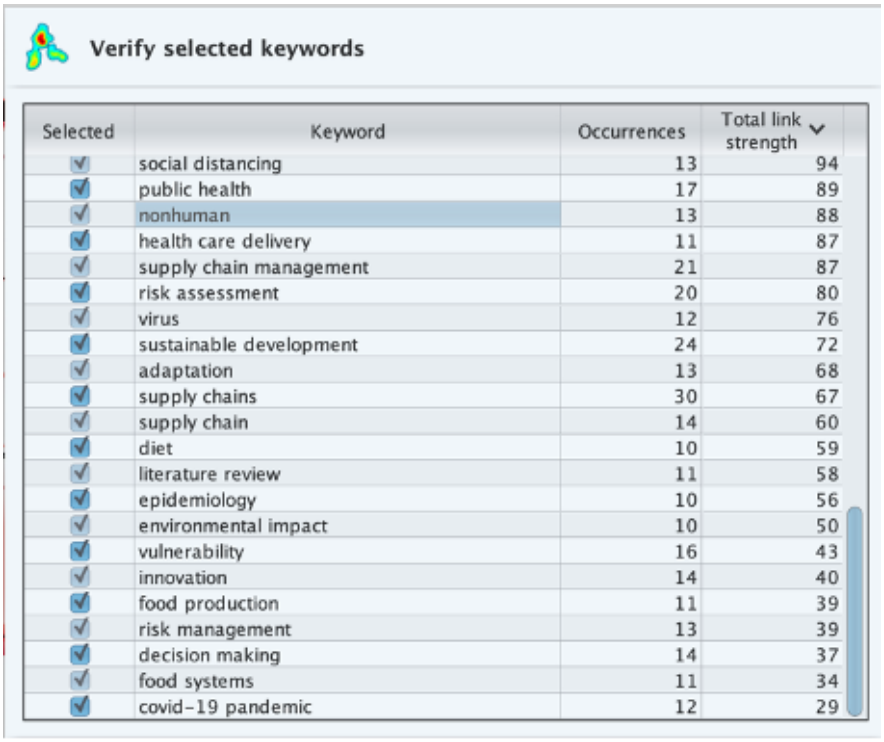


Figure 5 - Verifying keywords in VOSViewer

The data shows that “human” has the second highest occurrences of 77 and most link strength of 579 within the 454 articles, which was unexpected since it wasn’t one of our main searched keywords. The keyword with the most occurrences and spotted at second place for total link strength is covid-19 which was a bit expected since it falls under “pandemic”, one of our mainly searched keywords. “Pandemic” is placed forth which has the highest total link strength and occurrences amongst the three main keywords as seen above in *Figure 5*. Furthermore, “supply chain”, “supply chains” and “supply chain management” occurred in the search which was also expected but not as low as presented. “Adaptation” also occurred once but with an occurrence of 13 and total link strength of 68 which is presumably the lowest amongst the three (3) main keywords. To further narrow down the keywords of the documents imported to a more related search area, keywords such as Human, Humans, Article, Catering service, Adult, Female, Diet,

Male, Food system, Review, Agriculture, United States, Environmental impact, Animals, Animal, Epidemiology, Nonhuman, Controlled study, public health, Pneumonia/viral, Priority journal, Food supply and Climate change were all dropped. The reason is to focus more on the keywords relating to the study area.

The data in *Figure 5* minus the dropped keywords would therefore provide a combined and detailed overview of the selected keywords within the literature. After verifying the keywords, the maps were ready to be created and illustrated as follows.

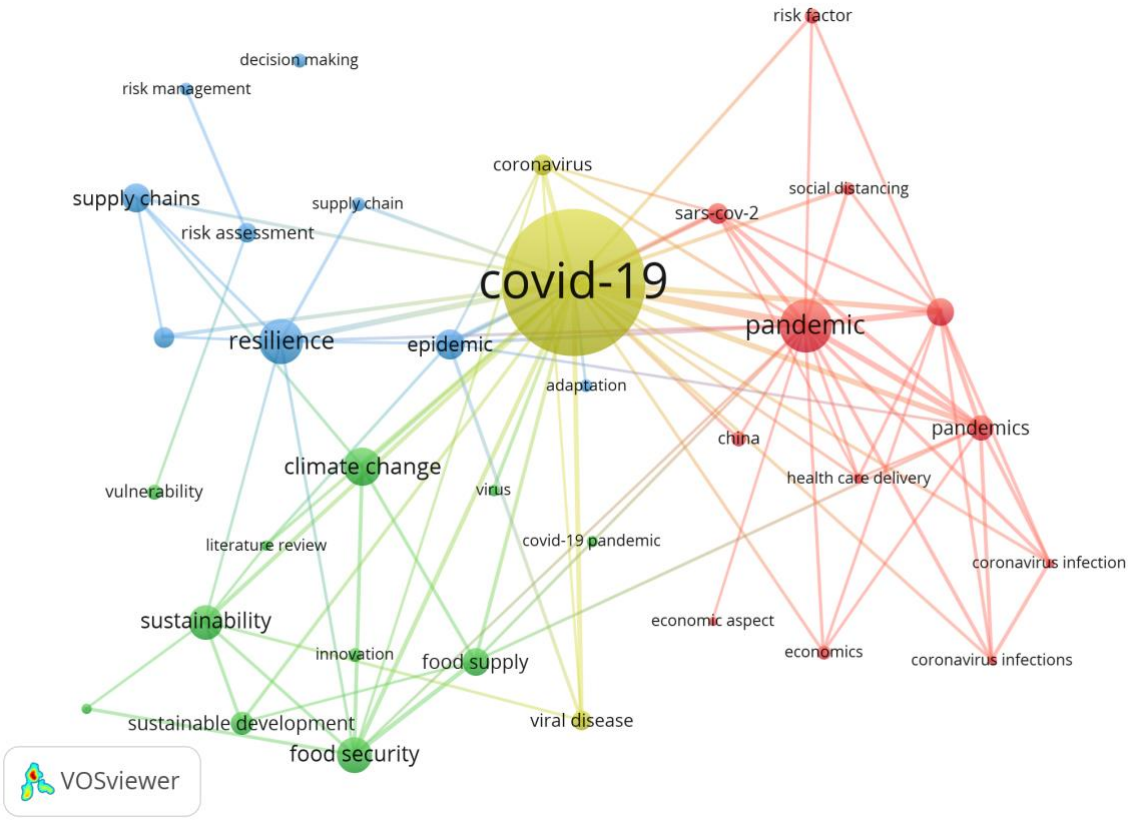


Illustration 1 – VOSViewer's network of the literature

Illustration 1 shows the occurrences of keywords with one major keyword, namely COVID-19 being the highest. The second highest is pandemic and thirdly resilience. As seen in the map, supply chain is linked strongest with COVID-19, resilience, climate change and supply chain management, meaning that a lot of interconnected interest occurs within these areas in most research. Pandemic links strongest with Risk factor, social distancing, sars-cov-2, coronavirus, COVID-19, resilience, epidemic, coronavirus disease 2019, China, healthcare delivery, coronavirus infection(s), and economics. Adaptation links strongest with only COVID-19.

This illustration helps to create an overview of the 454 articles with a focus on some selected keywords hereby guiding us to better understand the links between keywords and themes in the 454 articles.

3.3 Contingency table

The articles found within the research area on Scopus, and by VOSViewer which gave us an overview of the keywords via the abstracts of the articles was further processed to create a contingency table. Over here, literature of interest topics will be added in an explanatory manner. The 454 articles derived were divided by the research group of three members, and each group member began selecting significant materials on the subject matter. An article was measured on its academic language and subject area which meant a given article should explain something significant within the areas of Supply Chain, Pandemic or Adaptation.

The process from here on was to categorize the articles into the contingency table, which looks as follows.

Figure 6- Contingency table categorizations

Though the categories within the contingency table embodied different kinds of headings, more attention was placed on the research question, methodology, data/context, and findings. These categories provided an in-depth overview and understanding of the literature. Moreover, it gives us answers to what previously had been written on the given subject area, how this given research has been conducted, what findings this research gave, suggestions for further research and lastly, where there might be gaps within the literature. The table thereby helps us to understand what the research papers illuminate.

After a careful analysis and selection, 60 articles were found in all and data from these articles were put into the contingency table. The finished table can be seen in Appendix 1 & 2.

3.4 Measurement table

The contingency table gave a general overview of what specific articles the literature review would be conducted on and analyzed what the chosen articles elaborates. This created the need for a new

table, named the measurement table. The measurement table would indicate which keywords were present in the articles. It was executed by reading every article and answering “Yes” or “No” to what themes were present in the articles. “Yes” indicated the presence of a keyword within an article while “No” meant its absence. The finished table looks as follows and is provided as *Figure 7* below.

Measurement Table	Supply Chain	Pandemic	Adaptation	Resilience	COVID-19
Article 1	Yes	Yes	No	Yes	Yes
Article 2	Yes	Yes	No	No	Yes
Article 3	Yes	No	No	No	No
Article 4	Yes	Yes	Yes	Yes	Yes
Article 5	Yes	No	No	No	Yes
Article 6	No	No	No	No	Yes
Article 7	Yes	No	Yes	No	No
Article 8	Yes	No	No	No	No
Article 9	Yes	Yes	No	Yes	No
Article 10	Yes	Yes	No	Yes	Yes
Article 11	Yes	Yes	No	No	Yes
Article 12	Yes	No	No	No	No
Article 13	Yes	Yes	No	No	No
Article 14	Yes	Yes	Yes	Yes	Yes
Article 15	Yes	No	Yes	Yes	Yes
Article 16	No	No	No	Yes	No
Article 17	Yes	No	No	No	No
Article 18	Yes	No	No	No	No
Article 19	Yes	No	No	Yes	No
Article 20	Yes	No	No	No	No
Article 21	Yes	No	No	No	No
Article 22	Yes	No	No	No	No
Article 23	No	Yes	No	No	Yes
Article 24	Yes	Yes	No	No	Yes
Article 25	Yes	No	No	No	No
Article 26	No	No	Yes	No	No
Article 27	Yes	No	No	No	No
Article 28	Yes	Yes	No	No	Yes
Article 29	Yes	No	No	No	No
Article 30	Yes	No	No	No	No
Article 31	Yes	Yes	No	No	Yes
Article 32	Yes	No	No	No	No
Article 33	Yes	No	No	No	No
Article 34	Yes	No	Yes	No	No
Article 35	Yes	No	No	No	No
Article 36	Yes	No	No	No	No
Article 37	Yes	Yes	Yes	Yes	Yes
Article 38	Yes	No	Yes	No	No
Article 39	Yes	No	No	No	No
Article 40	Yes	No	Yes	No	No
Article 41	No	No	Yes	No	No
Article 42	No	No	Yes	No	No
Article 43	No	No	Yes	No	No
Article 44	No	No	No	No	No
Article 45	No	No	Yes	No	No
Article 46	No	No	Yes	No	No
Article 47	No	No	No	No	No
Article 48	Yes	No	No	No	No
Article 49	Yes	No	No	No	No
Article 50	No	No	No	No	No
Article 51	Yes	No	Yes	No	No
Article 52	Yes	No	Yes	No	No
Article 53	Yes	No	Yes	No	No
Article 54	Yes	No	Yes	No	No
Article 55	No	No	Yes	No	No
Article 56	No	Yes	No	No	No
Article 57	Yes	No	No	No	No
Article 58	Yes	No	No	No	No
Article 59	Yes	No	No	No	No
Article 60	Yes	No	Yes	No	No

Figure 7 - Measurement table

To illustrate this data from the measurement table more visually, a graph was created to show the number of times specific themes were mentioned or present in the chosen articles combined.

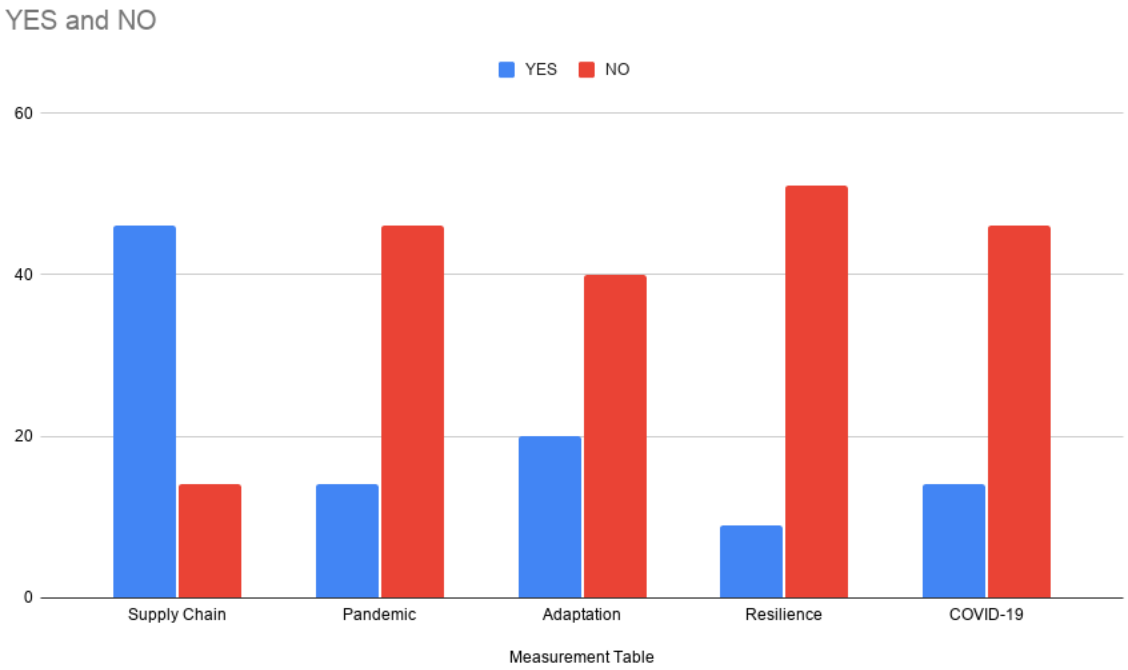


Figure 8 – Theme count

As the graph illustrates, the three largest players are still supply chain, pandemic, and adaptation. Supply Chain counted 46 times, Pandemic 14 times, Adaptation 20 times, Covid-19 14 times and at last, Resilience which counted 9 times.

3.5 Exogenous Shocks

There are various types of disruptions that can restructure the global business environment and create challenges or opportunities for corporations. These events include major terrorist attacks, natural disasters, the outbreak of disease, and the global financial crisis, all of which negatively affect efficient use of the global infrastructure and exchange system (Li & Tallman, 2011). Such devastating events are broadly known as exogenous shocks or events and pose significant challenges for multinational enterprises operating in various geographic locations because they are characterized by more uncertainty due to its interconnected nature (Ghoshal, 1987) (Miller, 1992).

Exogenous shocks are difficult to precisely forecast, however they have the ability to adversely affect firms' activities if management has not prepared adequately for them (Leonard-Barton, 1992). They also adversely affect economic systems (Hudecheck, et al., 2020) and the labor market and in the short term render many dominant business models ineffective (Morgan, et al., 2019). Some shocks are "black swans," which are events that are rare and nearly impossible to predict but have the ability to completely decimate firms and industries due to the magnitude of their destruction (Taleb, 2007).

For the purposes of this study, an exogenous shock is a disruptive phenomenon that occurs in the external environment of a business, over which it has no control but adversely impacts business activities. According to (Buldyrev, 2010) exogenous shocks can induce a series of failures in interconnected networks; however, managers tend to handle the effects of shocks on supply networks as one-time events rather than an inadequacy in the supply network structure (Levy, 1995). A Global Supply Chain is an excellent example of an interconnected network.

There has been some research on risk and disruption in supply chains. To mitigate against this, (Babich, et al., 2007) suggest that manufacturers have multiple suppliers. (Blackhurst, et al., 2004) recommended a network-based approach to retain important information in a supply chain and proposed potential methodologies to model uncertainty in supply chains. (Harland, et al., 2003) also provided a holistic view of risk assessment in the increasing product/service complexity, outsourcing and globalization in a supply network. Regarding disruption risk assessment, (Wagner & Bode, 2008) classify several supply chain risk sources while (Kleindorfer & Saad, 2005) provide a conceptual framework that assesses the combined activities of risk assessment and risk mitigation that are central to disruption risk management in supply chains. (Lu, et al., 2011) consider that product substitution may mitigate disruptions in supply chains however, it may not be applicable without alternative sourcing options. Flexible supply chains have also proven to be an effective strategy (Sheffi, 2005).

The findings from existing literature on the impact of exogenous shocks on a country is dependent on the type of shock and the industrial structure rather than the intensity of the shock (Song, et al., 2020). On businesses, they trigger change (Salamonsen, 2015). This is not surprising due to the profit seeking nature of businesses. (Corbo, et al., 2018) found that an exogenous shock triggered the adoption of a new business model characterized by speed and flexibility. This change was however not sudden but as a result of a gradual adaptation strategy.

Concerning the impact of these shocks on the GSC, (Fridgen, et al., n.d.) analyzed and quantified the impacts of exogenous shocks on supply networks using various simulations. Some of the

findings indicate that to reduce disruptions in the supply chain caused by exogenous shocks, companies must increase their safety stocks. The effectiveness of this strategy however depends on the intensity of the exogenous shock. Other effective strategies are for manufacturers to support multiple suppliers in their upstream to increase their storage capacity to reduce retailer disruptions. For the purpose of this study, the focus will be on pandemics as an exogenous shock particularly on the ongoing COVID 19 pandemic.

3.6 Theoretical Consideration

Theory testing and theory building are closely interrelated in the process of knowledge creation within a discipline (Colquitt & Zapata-Phelan, 2007). The literature on supply chain management identifies a number of theories that explains how businesses, especially MNEs manage their supply chains. The perspectives vary depending on which part of the supply chain is being studied. The table adapted from (Manzouri & Rahman, 2013) below lists some of these adaptation theories and how they have been used in supply chain management.

(Manzouri & Rahman, 2013) categorize these theories based on which resources and which part of the organizational supply chain emphasis should be focused on. There are three main classifications under which these theories fall under. These are relational, external, and inter-organizational.

The relational theories place emphasis on the power of relationship among supply chain partners to manage their internal activities and supply chain as a whole. These theories focus more on building trustworthy relationships between supply chain actors. This is very important during

exogenous events as information and knowledge sharing during such events are paramount to being resilient in such situations. Theories in the external category focus on the use of external resources in managing the supply chain. The emphasis is more on the capabilities of supply chain actors external to the organization, than on the organization's own resources in managing supply chains during events such as the coronavirus pandemic. The inter-organizational theories however focus on the organizations very own internal resources. (Manzouri & Rahman, 2013) explained that organizations should rely on their internal processes and activities in handling customer orders and all unexpected or unplanned activities that might affect the supply chain or increase cost.

However, they recognize that the real world is at times more complicated than that and hence propose additional categorizations that combine the individual categories. Looking at the nature of the corona pandemic especially with all the uncertainty around it, we believe a theory that builds on the relationship between supply chain members whilst also inculcating external resources of the supply chain members. (Manzouri & Rahman, 2013) believes that, in order for the supply chain to adapt in the events of an exogenous event, supply chain partners would need to have stronger and more intimate relationships between them. This builds trust and allows for knowledge, information and experience sharing without fear of losing competitiveness.

THEORY/PERSPECTIVE	DESCRIPTION	REFERENCE	CATEGORY
RESOURCE DEPENDENT THEORY	Focus is on supply chain partners working hand in hand to ensure maximum performance rather than acting in a manner that seeks only individual benefits	Sarkis et al. (2011) and Ketchen and Hult (2007b)	External
INSTITUTIONAL THEORY	Focus is on the influence of external institutions both formal and informal on the organization's actions. Organizations in the supply chain are advised to share knowledge and information	Ketchen and Hult (2007b), Sarkis et al. (2011), Lavassani and Movahedi (2010), Hirsch (1975) and DiMaggio and Powell (1983)	External
NETWORK THEORY/PERSPECTIVE	Suggests a combination of both strong and weak links in the creation of the supply chain	Jones et al (1997), Sarkis et al. (2011), Ketchen and Hult (2007b) and Halldorsson (2007)	Relational
JUST-IN-TIME	Focus is on being able to produce and deliverall products in the right time, right place, right quality and right quantity	Svensson (2001) and Bayo-Moriones et al. (2008)	Inter-organizational
THEORY OF CONSTRAINTS	Organizational managers areencouraged to identify and reduce constraints in the supply chain that limits the effectiveness of the chain.	Dettmer (1997)	Inter-organizational
TOTAL QUALITY MANAGEMENT (TQM)	Focus should also be directed at continuously improving the supply chain activities in order to develop competitive advantage for the organization.	Cua et al. (2001), Curkovic and Pagell (1999) and Reeda et al. (2005)	Inter-organizational and External
STAKEHOLDER THEORY	Focus is on the influence that organizational stakeholders have on business decisions that could either be positive or negative.	Freeman (1984), Sarkis et al. (2011) and Lavassani and Movahedi (2010)	External

Figure 8 Supply Chain Management Theories

For the purpose of this study, Transaction Cost (TC) theory, the network theory, the Resource Based View of the firm (RBV) as well it's extension Dynamic Capabilities were applied. The study seeks to look into GSCs and how they can adopt their activities in changing market environments whilst remaining operational in the midst of uncertainty. The main objective of engaging in GSC activities is cost reduction. The TC theory is therefore appropriate because the fundamental issue of the theory is whether a transaction is more efficiently performed within a firm or externally. However, an MNE is unlikely to outsource its core activities that differentiates it from other firms no matter how efficient it might be. Therefore, the TC theory alone is not sufficient to explain

which activities should be performed internally or externally. The RBV provides some more understanding of this. Given that the study seeks to look into how GSCs can adapt in changing market conditions (because they are exposed to more risk sometimes unpredictable), the Dynamic Capabilities theory was also applied.

3.7 Transaction Cost Theory

(Hobbs, 1996) has also defined it as the costs associated with any exchange, either between firms in a marketplace or the movement of resources between phases in a vertically integrated firm, when the neoclassical assumption of perfect and costless information is relaxed. (Hobbs, 1996) definition is broader and encompasses both costs incurred within a firm and outside it with suppliers and contractors and so will be adopted for this study. Transaction costs include research, instigation, negotiation, execution, adaptation and controlling costs (Dietl, 1993)

TC theory has been used for a wide range of strategic and organizational issues. Some of these include the analysis of firms internationalization processes and decisions (Buckley & Casson, 1976), (Rugman, 1981); strategic alliances (Hennart, 1991); (Balakrishnan & Koza, 1993), the design of internal Incentive systems ((Harris & Raviv, 1978), (Hoskisson & Hitt, 1988), distribution strategies (Anderson & Schmittlein, 1984)) and vertical integration decisions (Masten, et al., 1989)). (Grover & Malhotra, 2003) assert that it is the most cited theory in operations and SCM.

Ronald Coase is commonly viewed as the father of transaction cost theory. The theory was founded on the premise that markets and firms differ in costs associated with transactions. He posited that "Whether a transaction would be organized within the firm or whether it would be carried out on the market by independent contractors depended on a comparison of the costs of carrying out these market transactions with the costs of carrying out these transactions within an organization, the firm" (Coase, 1993)

This was further developed by Oliver Williamson. He suggested two important assumptions about economic actors (i.e., bounded rationality and opportunism) as well as three key dimensions of economic transactions (i.e., asset specificity, frequency, and uncertainty) (Williamson, 1985). Identifying these elements of a transaction enables researchers to explain why and where transactions are located. The theory is therefore broad and multifaceted. Some schools of thought view it as costs of carrying out an exchange while others view it as both the direct managing costs in exchange relationships and opportunity costs of making inferior governance decisions (Williamson, 1979). This paper adopts the latter view.

Opportunism means that people engaged in a transaction relationship will act in self-interest. This includes behaviors such as cheating, lying, and subtle forms of violation of agreements (Grover & Malhotra, 2003). *Asset Specificity* refers to the degree to which assets are custom-made to a specific transaction and cannot be easily diverted outside the relationship of the parties to the transaction. *Frequency* refers to the degree to which transactions recur (Geyskens, et al., 2006). It serves as a motivation for firms to take up hierarchical governance structure because the overhead cost associated with those is easier to recover for recurring transactions (Williamson, 1979).

Bounded rationality is the inability of humans to forecast all matters concerning a transaction (Neves, et al., 2014). The concept was first expressed by Herbert Simon in and alludes to the fact that while decision-makers might want to act rationally, they are restricted in their ability to receive, store, retrieve, and communicate information without error. This means that decision makers have limited proficiencies concerning their cognitive abilities and rationality. This is especially important under conditions of uncertainty. Uncertainty makes it difficult to completely stipulate the circumstances surrounding an exchange, thereby causing an economic problem. The result of bounded rationality, according to transaction costs, is that all complex contracts are unavoidably incomplete, because they are created to cover what is and all other contingencies which are impossible. *Uncertainty* refers to the unexpected changes in circumstances surrounding a transaction (Grover & Malhotra, 2003) and will be the focus of this paper. According to (Williamson, 1979) "not all future contingencies for which adaptations are required can be anticipated at the outset", the parties involved in the transaction should put in place the right mechanisms to protect the exchange relationship to make it robust to uncertainty.

3.7.1 Uncertainty and GSCs

SC relationships are characterized by risks and uncertainty (Hult, et al., 2010). These risks and uncertainties continue to rise with increasing globalization (Bogataj & Bogataj, 2007); therefore, it can be suggested that GSCs are characterized by more risk and uncertainties due to the complexities associated with operating across national borders.

Uncertainty is a situation where the likelihood of various future events is difficult to forecast (Srinivasan, et al., 2011). It also has to do with the difficulty of adapting to changes in particular conditions of time and place (Fynes, et al., 2004). Risk on the other hand, has to do with the likelihood of the occurrence of future events that is known to have been given some probability distribution (Milliken, 1987). High uncertainty encourages firms to be flexible. According to (Klein, 1989), "It appears that uncertainty is too broad a concept and that different facets of it led to both a desire for flexibility and a motivation to reduce transaction costs". There have been different ways to categorize uncertainty, however, this study adopts that of (Sutcliffe & Zaheer, 1998). According to them, there is primary, competitive and supplier uncertainty. Primary uncertainty originates from exogenous sources such as natural events, change in preferences and regulations. As such, primary uncertainty will be the focus of this study and will be referred to as exogenous shocks or events.

3.7.2 Transaction Cost Theory and GSCs

According to (Kinkel & Maloca, 2009) the main drivers of GCSs are: (1) cost reduction because of lower wages in emerging markets, (2) access to new sales markets, (3) compliance of local content clauses and (4) availability of manufacturing capacities and technical competencies. From the perspective of GSCs, TC theory can be used in explaining why firms outsource or offshore their activities, why they do so globally and what type of governance structure they adopt (David & Han, 2004). This is because the fundamental issue of the theory is whether a transaction is more efficiently performed within a firm (vertical integration) or externally, by autonomous contractors. It purports that the greater the investment in specialized assets and uncertainties surrounding a transaction, the greater the tendency to carry it inside the boundaries of the organization. In these

cases, firms choose internal forms of governance with the belief that they can respond to fluctuations in the market more readily than their suppliers (Kaufmann & Carter, 2006).

3.8 Supply Chain and Pandemics (Covid-19)

The disruption of a Supply Chain (SC) by an epidemic outbreak (i.e., COVID-19) considered an exogenous shock is one specific case that has drawn interest in recent literature. An epidemic is one of the major risks faced by a SC line which is made up of three sections as suggested by (Ivanov & Dolgui, 2020). He listed them as; "(a) long-term disruption existence and its unpredictable scaling, (b) simultaneous disruption propagation in the SC (i.e., the ripple effect) and epidemic outbreak propagation in the population (i.e., pandemic propagation), and (c) simultaneous disruptions in supply, demand, and logistics infrastructure". The outbreak of an epidemic begins small but scales fast and spreads largely over many geographic boundaries unlike other exogenous shocks. Moreover, in using the contractual law of physics to explain the evolution of supply chain designs, (Handfield, et al., 2020) suggests that the way a supply chain is designed may form an integral part of the organization's competitive advantage. This can however also be influenced by the decision managers make when confronted by exogenous threats such as COVID-19. (Araz, et al., 2020) underline that the outbreak of COVID-19 is a significant factor within the last decade which is "breaking many global supply chains".

The pandemic has had a huge impact on both upstream and downstream flows of material within the SC of business in pursuit of low production cost which has been largely shaped by the forces of globalization during the past two decades. The impact of COVID-19 has led to a new 'normal' due to the type of control measures put in place to support various supply chains. This has led to a

challenge in the SC ecosystem, network, flows and individual organizations in a new scale under high uncertainty (Sodhi, et al., 2021).

Researchers in an attempt to address the issue developed various simulations and adaptation procedures introduced in their literature to better understand the nature and degree of impact by a pandemic. For instance, in order to analyze the responsiveness level of food SC in India, (Singh, et al., 2020) developed a simulation model to confront the COVID-19 pandemic. It was observed that the scalability of SC capacity could improve responsiveness measured through the service level by centralizing the warehouses. Organizations whose supply chains are considered as more tightly compressed and responsive in nature may enjoy significant advantages during the impact of external threats such as COVID-19. This may further lead to the avoidance of being held hostage by political decisions from governments of other countries. These disruptions or external threats may have substantial negative effects on the return on sales, return on profit, stock return, brand image, employment in the firms, consumer's safety, and overall supply chain performance (Thun & Hoenig, 2011); (Chowdhury, et al., 2019) For example, Apple announced on the 17th of February to expect its quarterly earnings to drop due (Apple Inc., 2020). A significant result from (Ivanov & Dolgui, 2020) and (Singh, et al., 2020) as per their investigation was the observation made regarding the SC operations and performance. They mentioned that the SC is undergoing drastic degradation under the pandemic conditions and its effect has led to the need for adaptation strategies.

Some other researchers in the course of investigating the relationship between COVID-19 and SC developed a Conceptual Frameworks (CF). (Choi, 2020) developed a CF in various transportation literatures to inform the function of digital technologies and data-driving decision-making during the COVID-19 pandemic. (Ivanov & Dolgui, 2020) conceptualized by using Operational Research

(OR) and Management Science (MS) methodologies to manage the ripple effect within a SC caused by a pandemic. They revealed that in order to adapt a SC to an ongoing or post pandemic recovery period, managerial insights pertaining to network structural adaptation, SC process reconfiguration, and adapting production inventory control policies at individual firms can be utilized. (Queiroz, et al., 2020) also discussed the emerging research agenda for SC and management operations during the outbreak of pandemics. Six major procedures were mentioned in order to undertake this research agenda successfully. They were mentioned as follows: (1) preparedness focus (i.e. pre-allocation of resources, product diversification, and substitution), (2) anticipation focus (i.e. flexible production, re-allocations of supply and demand), (3) digital focus (i.e. digital manufacturing, data analytics), (4) ripple effect focus (i.e. control of disruption propagation, modelling of pandemic scenarios), (5) recovery focus (i.e. integral recovery of the workforce, capacities, and logistics), and (6) sustainability focus (i.e. viability analysis, intertwined supply networks). To add up, (Craighead, et al., 2020) elaborated on the notion of transilience to capture the ability and strategic positioning of an organization to simultaneously restore some processes and change others through transformation and resilience**.**

Other major studies made in the areas of SC and pandemic consisted of empirical theories that were undertaken to discover the antecedents and repercussions of SC disruptions during the pandemic and possible strategies for development. (Wieland, 2021) suggested an eclectic framework for SCs that takes into consideration adaptive cycles lined across different stages on ranges of time, space and meaning. The fluidity of his framework, structures and processes as per his concept, makes it easy to be reconfigured by blending with political economics and planetary occurrences. Leaving behind the static view of the SC and its management by replacing it with a vision of “dance the SC”, Wieland reinterprets the SC as a social ecological system similar to that

of reconfigurable SC framework by (Dolgui, et al., 2020). Further in his research, he proposes an unsettled question regarding SC management and how the post COVID-19 era can “build back better” in order to later overcome the various crises being faced. The idea is to ignore what should be done during the pandemic while focusing on the future possible pandemic threats and climatic changes. Meanwhile, (El Baz & Ruel, 2021) identified crucial decision-making strategies that can help an organization recover from the effect of a pandemic and continue by maintaining its SC activities. They made use of theories such as the resource-based view and organizational information processing to test the roles within SC risk management practices that were effective during the COVID-19 pandemic. In addition to, (Yang, et al., 2020) argued about the antecedents and repercussions of SC disruptions by respectively taking into consideration an organization’s; (1) SC risk management capabilities, (2) use of organic control and mechanistic control to model SC disruption and (3) SC visibility.

3.8.1 The Resource Based View of the Firm (RBV)

A business’ survival is inherently based on the resources they have at their disposal. These resources come in various forms for businesses. The RBV theory in supply chain management can be seen in a number of literatures including (Barney, et al., 2007)). The resources of a firm would determine how long or far they can extend their supply chain in order to effectively and efficiently compete.

RBV theory identifies both tangible and intangible assets for the firm to utilize. (Barratt & Oke, 2007) explain that the Resource-based theory "describes, explains, and predicts how firms can

achieve a sustainable competitive advantage through acquisition of and control over resources." As they described, in the end, businesses always seek to gain a competitive advantage over others. And these can be achieved through the resources that the business has.

Birger Wernerfelt is one of the authors who have contributed to the RBV theory and shaped it's understanding. He believed that the strategy of a firm should be viewed in terms of positioning its resources and not its products and markets (Neves, et al., 2014). He insisted that businesses should focus more on what they had more than their competitors as this would serve as a competitive advantage to them. As businesses may have a number of similar resources, a combination of resources was also seen to provide an edge over others. The adaptation of the RBV in supply chain management is to assist in informing the business where they have an edge and hence which part they can comfortably outsource.

It must however be noted that, for a business to consider something as a resource that would give them competitive advantage, there are some characteristics that they must embody. The literature generally agrees on four.

I. *Valuable (V)*
II. *Rare (R)*
III. *Difficult to imitate (I)*
IV. *Non - substitutable (N)*

These resources as already explained can be either tangible (physical assets like buildings and machinery) or intangible (know-how or information). From the RBV, more value is placed on intangible goods as compared to tangible ones. The belief is that intangible assets tend to be firmer

specific and hence better placed as an exclusive source of competitive advantage to the business. (Barratt & Oke, 2007)

From the supply chain perspective of RBV, firms must concentrate their resources on a set of core competencies in which they offer inimitable value to their customers and therefore have a significant advantage over rival firms (Quinn & Hilmer, 1994). In addition, they recommend outsourcing activities that do not require exceptional skills or impact the firm's critical strategy. Furthermore, if outsourcing exposes firms to exposure of leaking proprietary information (that is knowledge that cannot be patented), then the firm should take measures to reduce this exposure (Teece, 2007). Goods and services can be outsourced in a governance structure in which proprietary knowledge is secure. Otherwise, they should be conducted internally because internal mechanisms are better at protecting the firms' knowledge than contractual agreements between firms (Liebeskind, 1996)

The RBV considered resources and competencies as inert over a specific time frame. The central point was that VRIN resources enable firms to create value enriching strategies that are not imitated by competing firms (Barney, 1991); (Wernerfelt, 1984). However, in this era where the economy is fast changing, there is a need for firms to build up new capabilities or competencies for sustaining such competitive advantage. This brought about an extension of the RBV known as Dynamic capabilities (Teece, et al., 1997). The rationale was that RBV did not effectively explain how and why some firms have competitive advantage in situations of swift and erratic change (Eisenhardt & Martin, 2000). The dynamic capability theory also provides a very good perspective on how organizations can handle the shocks of pandemics. Dynamic capability is considered an

extension of the RBV theory. The main components of dynamic capabilities are the firms' resources and strategies. As indicated above, VRIN resources are a source of competitive advantage according to the RBV of the firm; however, RBV has been criticized for not providing a comprehensive approach to building competitive advantage (Wernerfelt, 1984) Although resources may consist of capabilities, the RBV does not specify which capabilities enable firms to excel. Another critique of the RBV is that it does not address how key resources can be converted when conditions require it. Due to these critiques, the research is more inclined towards the *Dynamic Capability* view.

3.9 Dynamic capabilities

Dynamic capabilities have been defined by various authors. (Teece, et al., 1997) define it as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments". It has also been defined as the organizational and strategic procedures through which firms modify and recombine their resources to create new value-creating strategies (Grant, 1996); (Pisano, 1994). They are the organizational and strategic routines by which firms achieve new resource configurations as markets develop, crash, fragment, advance, and die (Eisenhardt & Martin, 2000). All the definitions allude to dynamic capabilities being the firm's procedure for ensuring that it adapts and remains competitive in changing market conditions.

The literature on dynamic capability identifies three components. These are the resources of the organization, the strategies that are employed and then the capabilities that the organization has

(Teece, 2007). A combination of these is what usually makes up the dynamic capability of a firm. Resources as a component of dynamic capability is the link that

While capabilities are mainly about what product or service to provide, how and where to make, market, and distribute it, strategy helps to influence market entry and how to maintain competitive advantage (Teece, 2007). According to strategy theories such as Five Forces (Dobbs, 2012) and isolating mechanisms (Rumelt, 1987) the goal of strategy is to stay ahead of competitors by leveraging on their mistakes and the firms' internal strengths.

Capabilities, resources, and strategy are mutually dependent elements that jointly determine the competitiveness of a firm (Lorenzo, et al., 2018)). Competitive advantage is improved when these elements are robust and are aligned with each other and the external environment of the firm. To capture this interdependence, the dynamic capabilities framework adopts the language of co-specialization (Teece, 2007) which describes the added benefits produced by a set of two or more assets when they're used together rather than in isolation.

As already indicated, one of the strategies firms use to cut costs while remaining competitive is GSCs (Krause, Pagell & Curkovic, 2001). However, this also exposes especially lead firms to significant risks of disruptions that require effective management (Craighead, et al., n.d.); (Monczka, et al., 2006). This is more so now due to globalization and the interconnected nature of the world now where happenings in one part of the world can easily cause disruptions in another part of the world. Some disruptions are also caused by black swans which are not easily mitigated because of how rare they are and difficult to predict.

3.9.1 Capabilities

The core of the dynamic capability framework is ‘capability’ (Teece, 2007). Capabilities can be grouped into three different levels and the first is Ordinary capabilities, followed by Micro foundations and the Higher-level dynamic capabilities which has been elaborated on below (Teece, et al., 2016)

Ordinary capabilities are also known as 'zero-level' capabilities. They enable the manufacturing and selling of a distinct set of products and services and consist of the processes that deploy people, facilities, and equipment to carry out the current business of the firm (Teece, 2007). Strong ordinary capabilities allow a firm to achieve optimum levels of efficiency, irrespective of future sustainability. Therefore, capabilities that would modify products, the creation process, the scale, or the markets are not at the ordinary capabilities (Winter, 2003). They are easy to imitate therefore, are not a reliable sustainable advantage.

The next level of the capability is ‘microfoundations’ (Teece, 2007). These capabilities involve processes for forming external partnerships or for developing new products. They are usually distinctive routines that are employed less often than that of ordinary capabilities. Microfoundations allow the firm to integrate, reconfigure, add, or subtract resources, including ordinary capabilities (Eisenhardt & Martin, 2000).

The higher-level dynamic capabilities are activities and evaluations that leverage other capabilities and resources to maintain external fitness (Teece, et al., 1997). They can be summarized as three clusters of entrepreneurial activities that take place concomitantly throughout the organization:

sensing, seizing and transforming. They encompass organizational processes as well as unique managerial decisions (Augier & Teece, 2009); (Teece, 2007). These types of capabilities are what would be needed by organizations in events (Teece, 2007)of exogenous shocks that often blindsight organizations. Considering the complex nature of global supply chains on their own, coupled with unexpected exogenous shocks, organizations need the leverage of all their other capabilities to be better positioned for absorbing the shocks and bouncing back their supply chains. The three entrepreneurial activities which we would refer to as elements, provide a pre, during and post phases through which organizations employ their capabilities to adapt their supply chains.

'Sensing' capabilities enable organizations to continuously scan its external environment (Teece, 2007). It generates information and unstructured data from the external environment into the organizational system. It has been implied that sensing does not only include external scanning but also an internal aspect (Babelytė-Labanauskė, 2017). However, because this study is focused on exogenous shocks, the focus is mostly on the external environment. This involves spotting opportunities and predicting competitive threats (Lorenzen & Mudambi, 2013)It may also involve scanning for information on events such as natural disasters and pandemics which may directly or indirectly impact a firm's activities. Sensing can either take place formally through rigorous market research or informally by employees scanning for information in the news (Kump, et al., 2019). It can therefore be posited that an organization that continuously scans its environment can access the relevant information concerning exogenous shocks that will enable it to withstand or absorb these shocks.

'Seizing' means that market opportunities are successfully taken advantage of while threats are evaded. It involves the development of business opportunities that fit with the organization's external environment and its strengths and weaknesses (Teece, et al., 1997) Seizing capabilities within an organization are high if it is able to identify relevant information, to convert valuable information into tangible business prospects that are appropriate for its strengths and weaknesses and to make the consequent choices. Strategy that enables the detection of valuable knowledge is the foundation of seizing. MNEs' seizing involves the creation of global linkages, for the allocation of resources and capabilities (Lorenzen, 2013). It establishes the avenues to generate and utilize the 'sensed' competitive advantages of future resource–capability recombination's (Matysiak, et al., 2018).

According to (Teece, et al., 1997) *transforming* is "enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets". He further adds that it is the "ability to recombine and to reconfigure assets and organizational structures as the enterprise grows, and as markets and technologies change" (p. 1335). Transforming is similar to implementation capacity. This involves the ability to implement and organize strategic decision and corporate change, which comprises a variety of managerial and organizational processes, depending on the nature of the objective (Li & Liu, 2014). An organization with a high transforming capacity steadily applies decided renewal activities by allocating tasks, assigning resources, and ensuring that the employees have the newly vital knowledge (Kump, et al., 2019)

In summary, the ability of the supply chain to withstand and/or survive exogenous events comes down to its dynamic capability. Scholars have used RBV (Barney, et al., 2001); (Wernerfelt, 1984) and its extensions of the dynamic capability view (Teece, et al., 1997) to investigate supply chain

agility (Blome, et al., 2013); (Gligor, et al., 2016) or the combined effect of supply chain agility and adaptability (Eckstein, et al., 2015) and resilience and robustness (Brandon-Jones, et al., 2014).

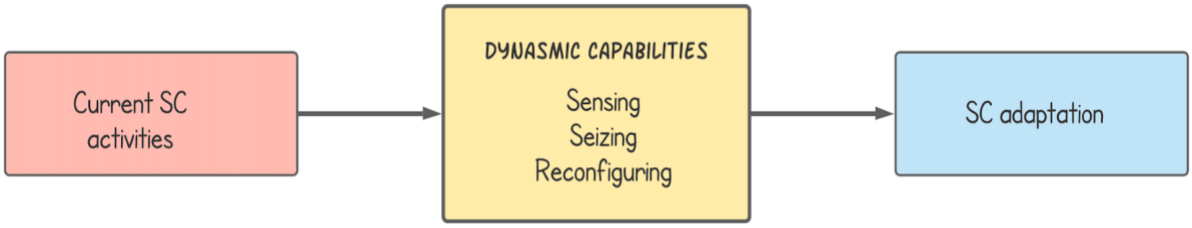


Figure 9 - Adopted from (Teece, et al., 1997).

3.10 Organizational Adaptation

Adapting operations to quickly mitigate the effects of the COVID-19 pandemic has proved to not be as easy as previous exogenous events. The concept of resilience tends to explain business's ability to survive events of such nature. A prominent feature of such businesses in the literature is *Viability*. (Ivanov & Dolgui, 2020) explains viability as the 'ability of a supply chain to maintain itself and survive in a changing environment through a redesign of structures and replanning of performance with long-term impacts. Ivanov's understanding of viability included the overall business survival through a transition from a closed system that was more reactionary. He referred to this as a 'bounce-back' view of business operations. Here systems are seen to only act after an event has occurred. Businesses should now have a more open system where they don't just 'bounce-back' but also move forward and adapt.

When it comes to the supply chain of businesses adapting to exogenous events, the literature seems to agree more on the viability concept. The pandemic caused major disruptions among

manufacturing companies. Seeing as most of these companies sourced their supply from China, which was the starting point of the pandemic. A survey conducted by the Institute of Supply Management indicated that 75% of companies experienced supply chain disruptions due to the Covid-19 pandemic (Institute for Supply Management (ISM), April 2020). This does not come as a surprise considering the complex nature of global supply chains. A case in point is the current chip shortage that has severely affected the American Automobile market. With some experts suggesting a move that would bring manufacturing of key components closer to home, thereby cutting off parts of the supply chain in China or other overseas countries. However, some have also indicated the futility in this decision and have on the other hand proposed a more flexible supply chain that sources from different locations (Jones, 2021).

Since the emergence of Covid-19, business researchers have begun to reassess their understanding of what a resilient business should entail. (Vogus & Sutcliffe, 2007) explained a resilient organization as one that could withstand discrete errors, scandals, crises and shocks such as black swan events, and disruptions of routines as well as ongoing risks (e.g., competition), stresses, and strain. The corona pandemic as stated earlier has had varying impacts on all spheres of businesses. It is worth mentioning that the literature on resilience has mainly fallen into two perspectives. This aligns with (Ivanov & Dolgui, 2020) explained in their research.

The first perspective more or less has a bounce-back view. (Lengnick-Hall & Beck, 2003) explained this as ‘’simply an ability to rebound from unexpected, stressful, adverse situations and to pick up where they left off’’. This view is also shared by a number of notable authors (Balu, 2001); (Dutton, et al., 2002); (Gittell, et al., 2006); (Horne & Orr, 1998); (Mallak, 1998b); (Robb, 2000); (Rudolph & Repenning, 2002); (Sutcliffe & Vogus, 2003). Most organizations are barely able to survive black swan events. These events, depending on the form in which they present

themselves, for example the financial crisis of 2008, tend to cause a lot of organizations to go out of business.

The second perspective however looks beyond just rebounding and getting back to equilibrium. Organizations look to learn and adapt from these crises and come out better than they were before. (Sawalha, 2014) described it as involving being able to identify potential risks, developing early warning systems and then putting necessary proactive measures in place. This perspective is equally shared by a number of people as well (Coutu, 2002); (Freeman, et al., 2004); (Guidimann, 2002); (Jamrog, et al., 2006); (Layne, 2001); (Lengnick-Hall & Beck, 2003); (Weick, 1988).

From these two perspectives, there have been a number of prominent elements that seem to run through all these businesses that are deemed to be resilient. The elements further encompass several factors that define them. The categorization made by (Fiksel, 2015) consisting of Adaptability, Coherence, Efficiency, and Diversity best describes a resilient organization. However, with supply chain adaptability, organizations need also to be agile to counteract the initial impacts of exogenous shocks (Dubey, et al., 2019).

From (Lee, 2004); (Swafford , et al., 2006)), they describe supply chain agility as a capability of the supply chain to be able to respond quickly and effectively to changes that happen in the market. This infers that supply chains should have the intrinsic ability to adjust as quickly and effectively as possible to exogenous shocks. Supply chains that are agile enable organizations to be adaptable during such unexpected and unprecedented shocks (Lin, et al., 2006). (Dubey, et al., 2019) defines Agility as "the property of a supply chain that enables it to sense short-term, temporary changes in supply chain and market environment, and flexibly and rapidly respond to these changes".

With the complexities associated with global supply chains, it is imperative that supply chains have the capability to be agile if they are to have any chance of surviving exogenous events. Agility is an important capability for businesses to have in their need to be as competitive as possible in uncertain business environments (Tseng & Lin, 2011). (Lee, 2004) highlights agility as the "fundamental characteristic" of the very best supply chains. Firms' ability to adjust their way of doing things in response to environmental changes, opportunities and threats are considered competitive advantages (Gligor, et al., 2016); (Eckstein, et al., 2015).

Supply chain managers have always known or anticipated the impact that an exogenous event could cause to their supply chain. However, despite the level of preparedness that some businesses had prior to the corona pandemic, the supply chains proved incapable of being resilient. According to (Francis, 2008); (Barratt & Oke, 2007); (Jüttner & Maklan, 2011); (Brandon-Jones, et al., 2014) this could be recognized as being caused by the inadequacy or lack of visibility which makes a supply chain capable. There is no one specific use of the term, with various scholars connecting *visibility* to sharing information (Lamming, et al., 2001) and others connect it to product-related information, the responsiveness of the supply chain (Williams, et al., 2013), inventory monitoring (Petersen, et al., 2005) and coordination taking place in humanitarian supply chains when faced with a disaster (Maghsoudi & Pazirandeh, 2016). For the purpose of this research, we side with Lamming et al.'s ideology to the term visibility.

The concept of supply chain visibility plays a crucial role in the ability for a supply chain to be agile and adapt fully. (Kaipia & Hartiala, 2006) defined supply chain visibility as "the sharing of all relevant information between SC partners, even over echelons in the chain". (Kalaiarasan, et al., 2020) also formulated the following definition as "the extent to which actors within the production system have visual access to the timely and accurate demand and supply information

that they consider to be key or useful to their operations". This implies the importance of needed accuracy and trustworthiness in a supply chain line. Moreover, the role of visibility in enabling agility has been highlighted by (Christopher, 2000) which further enables organizational adaptation.

There's no doubt that higher speed and efficiency aids the supply chain to effectively adapt to a changing environment, but this may however not be sufficient. The advantages of visibility within a supply chain consist of improved responsiveness, planning and replenishment, improved decision making, as well as quality of products (Barratt & Oke, 2007). Moreover, Sanders et al., (2019) considers visibility as a key factor for competitiveness among industrial leaders basing this argument on the principles of digitalization and connectivity. They considered visibility in this case as a means of "having the information you need at the time you need it". However, the information should be mostly current, accurate, complete, and formatted so as to be useful.

Having gone through the literature, the study recognizes the presence of three supporting key features that are essential for businesses in adapting to exogenous shocks. Viability and Visibility coupled with Agility can be considered as drivers of adaptation for supply chains.

3.11 Conceptual Framework

The literature on supply chain adaptation has been developing at a faster and steady rate since the outbreak of the coronavirus. In contributing to the field, this study adopts the dynamic capability theory as a lens for understanding and assessing supply chain adaptation. Building from the resource-based view and transaction cost theories, a framework is developed. It has been argued that the RBV theory can explain a variety of firm and supply chain outcomes (Esper & Crook,

2014); (Hitt, et al., 2016). RBV asserts that by building strategic resources and capabilities a firm can gain competitive advantage (Barney, et al., 2001). (Eckstein, et al., 2015) have suggested on the basis of previous research (Blome, et al., 2013); (Gligor, et al., 2016) that supply chain agility and adaptability can be considered dynamic capabilities which is considered an extension of RBV (Teece, et al., 1997) that arise from the firm's capacity to reconfigure firm-level and supply chain-level resources. (Augier & Teece, 2009) have posit that when dynamic capabilities enable organizations to gain coordination within a supply chain, they benefit from complementarities and better decision-making policies (Gligor, et al., 2016).

According to the TC theory, uncertainty encourages firms to be flexible. For this to be achieved, this paper proposes that MNEs have inherent Dynamic Capabilities that make them more flexible. Flexibility ensures that MNEs can adapt and remain competitive in changing market conditions. This is especially important because some exogenous shocks are unpredictable with devastating effects. This necessitates the need for what we refer to as drivers for supply chain adaptation. Organizations in addition to leveraging their dynamic capabilities, need also to build a supply chain that encompasses Agility, Viability and Visibility features.

Dynamic capability from the literature provided a blueprint on which the conceptual framework was developed. The three organizational processes expected from business managers lays a foundation upon which organizations can apply in adapting their supply chains in the event of an exogenous shock. Together with supply chain viability, visibility and agility, organizations can adapt the three processes in their quest to adapt to these shocks.

Sensing will encompass all activities that place the organization in a position to anticipate or forecast such exogenous events despite all the uncertainty that characterizes it. *Seizing* describes

the organization's ability to absorb and integrate new business functions into the existing operational chain. The ability for the supply chain to keep working and not halt when an exogenous event like that of the corona pandemic hits, keeps a business afloat. In addition to absorbing the initial and aftershocks, the organization needs to be able to integrate new directions into existing operations. Last but not the least is *Transforming,* which indicates a change in way of previously doing things to a new and better one. With transformation, the supply chain is able to reconfigure and fully adapt to current situations. This builds a platform for sensing the next events as adequately as they can.

Due to the nature of exogenous events, as has been explained in detail earlier, the focus for businesses is to build and develop capabilities that will enable them to absorb and integrate their new circumstances. And then reconfigure themselves in order to adapt to these circumstances.

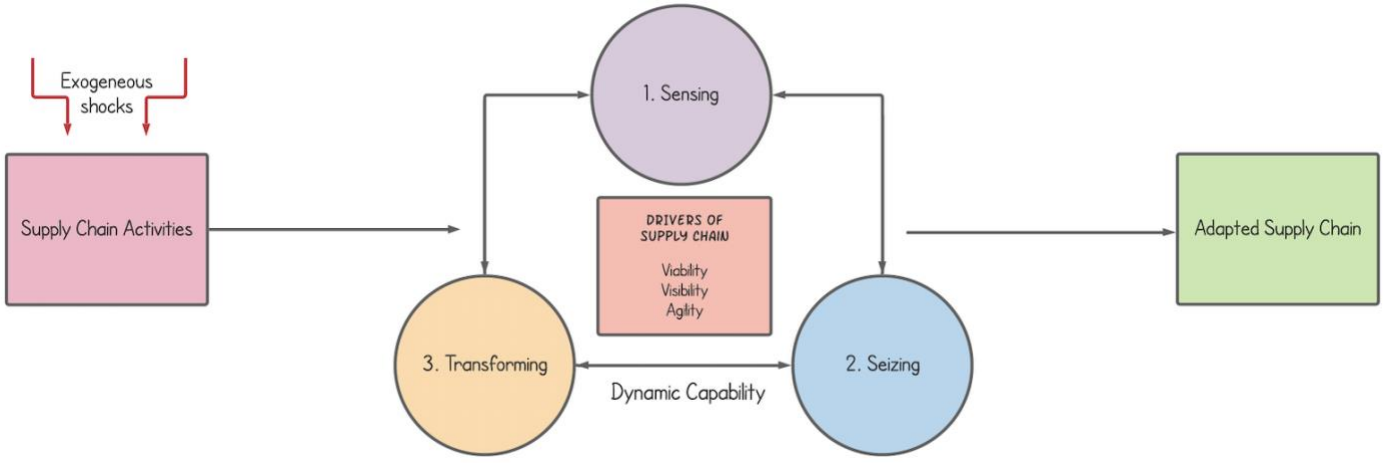


Figure 10 - Own composition

Chapter 4: Methodology

The analysis of a problem can be conducted in several ways and is strongly related to the structure of the problem formulation as well as the objective of the research-based answer. To understand the logic about how and why the problem analysis in this project is performed, the way it is, this chapter illustrates the philosophical position as well as the methodological perspective of this research. First, the philosophical assumption upon which the research is based will be stated. Followed by an explanation about the research design, research method and data collection as well as research approach and data analysis (Figure 11).

Structure of Methodology

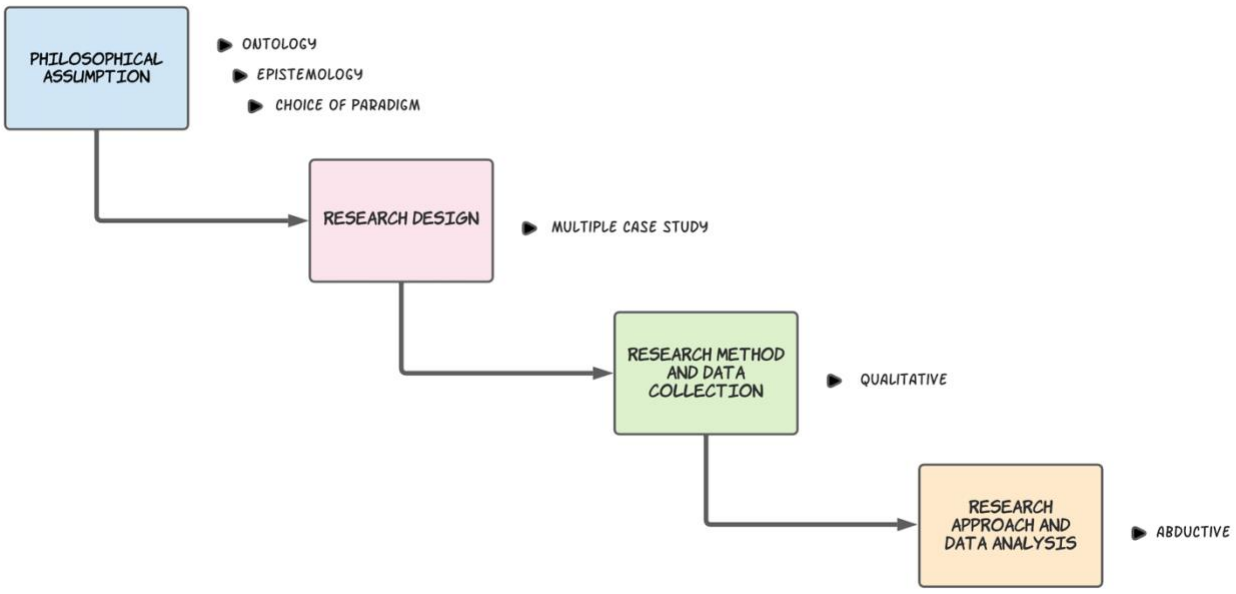


Figure 11 – Own composition with inspiration from (Kuada, 2012)

4. 1 Philosophical Assumptions

This section of the project describes our views as researchers with regards to the ontological, epistemological and the choice of paradigm concerning the research. The themes are illustrated to better understand how the research group perceives reality and how we gain or perceive knowledge on the topic.

4.1.1 Ontology

To better understand the ontological stand of the research, thus considering where our focus is on what we as researchers seek to know (i.e., the "knowable" or "reality"), we referred to (Burrell & Morgan, 2017) and (Kuada, 2012). They argued that an objective approach to ontology should be seen as *Realism* whereas a subjective approach to it could be considered as *Nominalism*. While realism is seen to postulate that the social world is real and external to each persons' cognition, nominalism on the other hand draws an assumption that reality is constructed by individuals interacting with one another and that one can therefore consider multiple realities in social science. Moreover, realism suggests that the world is made up of hard, tangible, and relatively immutable structures while with nominalism the individuals who interact with each other do that by presenting themselves in the form of names, concepts, and labels.

The aim of this project is to create a conceptual framework which provides a justifiable solution for the research question. The theories utilized in our literature were based on the studies of other researchers who had tested and tried to understand what needed to be done to mitigate or overcome the effects of certain exogenous shocks on a supply chain. After a critical consideration, the research group was able to draw an analogy between the philosophical assumptions. The assumptions were inclined towards a more subjective ontological approach not disregarding some

signs of an objective ontological approach as well. The generated framework illuminates essential elements which guides MNE's in the European brewery industry to mitigate the effects of exogenous shocks. To develop the conceptual framework, a thematic literature review was conducted focusing on articles elaborating supply chain adaptation to aid us identify key important features. Also, the Environmental, Social and Governmental (ESG) report, the Annual Reports and Official Websites of 8 European MNEs alcoholic beverage company's information were analyzed and tested on the conceptualized framework. These MNE's had a better or an almost fully functioning supply chain lines regardless of the exogenous shock's (COVID-19) impact which justifies their selection. The reason for this analysis is based on the logic that the literature's theoretical consideration alone isn't sufficient and may lead to a bias in the framework's applicability. As such, the mentioned MNE's had to be considered since the examined articles are not restricted or related to the target industry.

As per the above elaboration, it can first be argued that the research group sides with a subjective ontological approach indicating the existence of multiple realities. To us, reality can be shaped by its context and must be taken into consideration. This motivated us to examine the framework using the 2020 ESG reports of the aforementioned companies each to assess insights from the target industry. Moreover, the research group considered the fact that the decisions for selecting essential elements to create the framework is based on individual assessment which cannot be only objectively measured even if reality is observed from the outside. However, it is to no surprise that the research group also has an objective ontological standing because it believes that reality can be observed from outside of themselves (i.e., believe in external reality). This is known by the fact that various articles were examined to give a clear understanding on what supply chain adaptation entails in the presence of exogenous shocks. These articles' existence is independent of themselves

or their interaction and are thereby observed from the outside. In general, it could be assumed that the ontology position for this research lies between an objective and more subjective perspective of reality as elaborated on and clarified above.

4.1.2 Epistemology

Just like that of ontology, there are several definitions for epistemology, but the research group sides with that of Bryman and Bell. According to (Bryman & Bell, 2011), "an epistemological issue concerns the question of what is (or should be) regarded as acceptable knowledge in a discipline. A particularly central issue in this context is the question of whether or not the social world can and should be studied according to the same principles, procedures, and ethos as the natural sciences". Generally, there are several epistemological positions in different literatures indicated by various scholars. But then again, the research group stands with that of Bryman and Bell which considers epistemology in two common perspectives namely *Positivism* and *Interpretivism* as the terms completely oppose each other.

To define positivism, Bryman and Bell suggest that positivism is an "epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond. But the term stretches beyond this principle, though the constituent elements vary between authors.". Contrary to positivism, they described interpretivism as "taken to denote an alternative to the positivist orthodoxy that has held sway for decades. It is predicated upon the view that a strategy is required that respects the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action." (Bryman & Bell, 2011).

The creation of a conceptualized framework has been the goal of this research as stated initially. As such, it can be argued that the study group follows an interpretivist epistemological position. This is because the result of the framework is drawn from the various interpretations of the examined articles coupled with the experience of the research group in terms of the subject area being supply chain adaptation to exogenous shocks. Therefore, it can be said that the interaction between the three researchers within the study group as well as the discussions had, have led to an interpretive understanding of the acquired knowledge and to the creation of a framework. Moreover, to answer the research question and develop a conceptual framework, the process utilized in knowledge gathering was based on; (1) the mixture of subjective interpretation from the articles, (2) the individual experience of each researcher within the group and (3) the interactions with one other. To sum up, rather than testing or measuring an already existing framework to verify or falsify its validity, the research group pursued an approach that seeks to understand and answer the research question.

4.1.3 Choice of paradigm

As for the term paradigm, (Bryman & Bell, 2011) defined it as "a cluster of beliefs and dictates which for scientists in a particular discipline influence what should be studied, how research should be done, [and] how results should be interpreted.". The research group's awareness of the ontological and epistemological considerations allows us to identify the appropriate philosophical paradigm. Moreover, this paradigm also supports the stated assumptions in the most appropriate way as mentioned in the ontological and epistemological section above. After thorough reflections the research group sides with the philosophical paradigm called *Critical Realism*. In defining critical realism, (Haigh, et al., 2019) elaborates that "*Critical realism is a relatively new paradigm*

position. It represents a combination of views that contrast with those associated with traditional positivist and interpretivist positions".

As mentioned initially in the ontological section of this literature, the assumptions were inclined towards a more subjective ontological approach. However, not disregarding some signs of an objective ontological approach, the research shows elements that tend to move it also a bit towards a positivist position as well but not more than the latter. To place the research between a less traditionally positivist and interpretivist positions would be considering it as a *Critical realism* position. Critical realism indicates an ontology position between those two views, which matches with the researchers' assumptions. Furthermore, it allows an interpretivist epistemology, which also reflects our consideration.

4.2 Research Design

An empirical analysis of the European Alcoholic Beverage industry is done using a netnographic approach. In contrast to the traditional ethnographic method, the netnographic approach focuses on data available on the internet (Xun & Reynolds, 2010). A netnographic approach using secondary data sources provided flexibility and feasibility in analyzing more companies. For the period of the research, a cross sectional design is adopted. The study is interested in assessing the supply chain adaptation strategies of some organizations during the period after the pandemic hit that enabled them to remain competitive despite the disruptions. Multiple firms were used because it allowed for an analysis of the results from each organization for patterns which were then assessed with the conceptual framework explained by the Dynamic Capabilities theory.

4.3 Research Method and Data Collection

The European Union (EU) was selected for this study because it dominates the alcoholic beverages market (WHO European Regional Office, 2021). It is also the heaviest drinking region of the world. The EU plays an integral role in the global alcohol market where one-fourth of the world's alcohol and over half of the wine production originates from (Anderson & Baumberg, 2006). MNEs were also analyzed because they usually have the resources to survive unforeseen crisis.

The qualitative approach is acceptable because GSCs are contemporary and have complex and dependent relationships in the context in which it occurs (Yin, 2009). The Dynamic Capabilities theory was applied in this study using internal secondary data at the firm level (Madhok, 2002). A single analytical method was adopted rather than a more quantitative or mixed method.

4.3.1 Data

As mentioned earlier, internal secondary data available on the internet for the organizations was used for the study. Data was extracted from a variety of public domain documents as done by (Turner, 2002). 2020 Annual Reports, ESG Reports, Company Websites, and News Articles were utilized. These reports had information on the 2019/2020 annual year where the pandemic began and was at its peak. It therefore contained the relevant information on the impact of the pandemic as well as strategies that were adopted to withstand its impact. Company websites were also assessed for additional information. Although these sources of data are authentic and meaningful, they are subject to issues of credibility and representativeness (Bell, et al., 2018). To account for

this triangulation (Guba & Lincoln, 1994) was adopted to verify extracted information from multiple sources.

4.3.2 Sampling

The study applied a non-probability, cluster sampling method (Babbie, 2004). The sample for the study was chosen from the food and beverage cluster of the top 26 Alcoholic Beverages Companies in the world as of January 2021. The classification was done using the companies market capital. The European MNEs that had published their 2020 Annual and ESG reports before May 2021 were chosen. These MNEs however also produce other types of beverages such as soft drinks, energy drinks and water.

4.4 Research Approach and Data Analysis

From our ontological and epistemological perspective, a qualitative approach to the research has been employed. By adapting the positivist perspective, we believe that the supply chain's ability to adapt during the pandemic can be studied based on the causes and effects (Kuada, 2012). Based on our belief that there is not one true way for businesses to sufficiently adapt to exogenous events in all circumstances, we will therefore implore a more abductive approach. (Bell, et al., 2018) discuss two approaches in trying to understand a phenomenon. One where theory is the focal point for data collection and analysis, and another where theory is generated after the analysis has been done. These are the deductive and inductive approaches respectively.

The abductive approach that we adopt for this research provides us with a blend of both the deductive and the inductive methods. This will enable us to offset the shortcomings that come with

the two main approaches. According to (Dudovskiy, 2021), an abductive approach seeks to find the ‘best’ explanation in an attempt to clarify ‘surprising facts’ or ‘puzzles’. These puzzles could be events or phenomena that are mostly unexpected or difficult to understand.

Considering the nature of the corona pandemic and all the uncertainties surrounding it, generating a specific conclusion as to how best businesses can adapt to it would be inadequate at this moment. Despite all the knowledge currently available on the corona pandemic, it is still a relatively new field with regards to how it affects supply chains. Therefore, an abductive approach will help us generate the best possible prediction after observing and taking into account the various incomplete information.

Research in this area is still ongoing and developing with the introduction of new information and data each day. An abductive approach therefore allows us to investigate various theoretical frameworks and provide an insight based on company data in an attempt to predict the best possible solution to how businesses can adapt their supply chains.

For the abductive approach, we first analyze the literature on supply chain adaptations in relation to exogenous events through a thematic literature review. From this, we develop a conceptual framework based on which the data would be analyzed. The data from the ESG reports is analyzed on the conceptual framework to identify and present best predictions for supply chain adaptation. After that, additions, deviations, and similarities from the analysis are looked at and used to further develop and explain the framework.

First, we analyze the recent literature and identify some of the general characteristics of adaptation strategies during the COVID-19 pandemic. We then describe case studies to illustrate the practical context and supplement the literature analysis to derive relevant determinants for building of a conceptual framework and construction of a formal model. In the conceptual frame- work, we show how the adaptation strategies can be aligned with the SC viability, encompassing the levels of the ecosystem, network, and resources. In the generalized model, we formalize the impacts and efforts in deploying and assessing the adaptation strategies as both a process and an outcome. We close by proposing some open research questions and outline several future research directions.

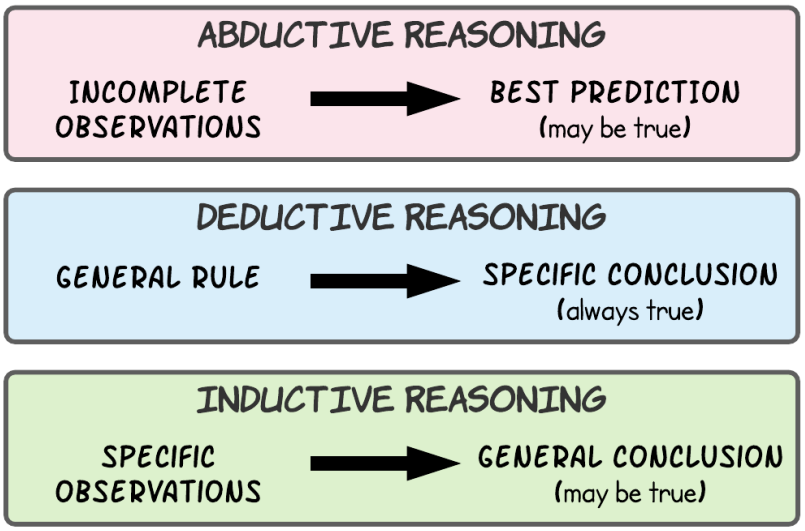


Figure 12 – Three Different Research Approach (Dudovskiy, 2021).

Chapter 5: Data Analysis

As discussed in the previous sections, the focus of this study is to analyze how multinational enterprises, mainly in the alcoholic beverage industry, were able to adapt their global supply chains to the impact of the corona pandemic. Considering the numerous restrictions that were put in place by various governments that literally shut down the on-trade businesses of the alcoholic beverage industry, the study intends to understand how these MNEs were able to adapt and survive in these times. Based on our conceptualization, and after having gone through the literature on supply chain adaptation, we analyze how 8 of the biggest MNEs in the alcoholic beverage industry in Europe adapted their supply chains.

The analysis is done on the ESG reports and the 2020 annual reports for these organizations. These reports served to provide us with inside information on how the organizations went about handling the corona pandemic. It is also important to mention that some secondary information from news articles were used to supplement the information that was deduced from the reports.

The framework serves us a reference on which the analysis is going to be done. We analyzed the organizations based on the three elements of the higher-level type of dynamic capability which is Sensing, Seizing and Transforming. We try to identify parts of the organization's activities that would give an insight as to how they went about the impact of the coronavirus pandemic.

The subsequent paragraphs will provide an overview of first, the overall alcoholic beverage industry with focus on the European market, and then also take a look at the eight MNEs that were used for the analysis. After that, the organizations would be analyzed to determine whether they

adopted the three elements in their quest to adapt their supply chains. Also, based on the reports, we try to figure out if the organizations exhibited characteristics of the three drivers identified as essential in supply chain adaptation.

5.1 General Overview of MNEs

The global Alcoholic Beverages Industry was estimated to record growth of around a CAGR of 3.1% over the forecast period 2019-2025 (Mordor Intelligence, 2018). However, the outbreak of COVID-19 has affected firms operating in the industry across the globe and Europe has not been any different. The European alcoholic beverage market is segmented by product type (beer, wine, spirits), distribution channel (on-trade and off-trade) and geography. The on-trade channel involves sales to license premises such as bars, hotels, and restaurants whereas the off-trade segment includes retail outlets such as supermarkets/hypermarkets, specialist stores, online stores, and others.

The spread of the pandemic and ensuing government restrictions resulted in supply chain disruptions and MNEs were forced to adapt their business activities. At the beginning of the pandemic when little information was available on the disease, the WHO entreated governments to enforce measures which limit alcohol consumption (WHO, 2020). The organization also advised individuals to limit their alcohol consumption and rather pursue a healthier lifestyle to strengthen their immune system to help fight against the spread of the disease.

Companies in the European Alcoholic Beverage industry reported a decrease in revenue from their on-trade channels while off-trade channels picked up.

NO	COMPANY	GLOBAL PRESENCE	PRODUCTS	2020 REVENUE (€M)	2020 PROFIT/LOSS(€M)	PERCENTAGE CHANGE IN PROFIT	REMARKS ON 2020 PERFORMANCE BY CEOS
1	Carlsberg	Western, Central and Eastern Europe, Asia	Alcoholic/non-alcoholic beer, Soft drink, Cider, Water	7,841	916	-8.5%	Revenue was negatively impacted by COVID-19 in most markets and by negative currency developments, mainly in Russia, Norway and China.
2	Heineken	Africa, Middle East, Asia Pacific, Americas	Alcoholic/non-alcoholic beer, Cider	23,770	- 88	-109.4%	Revenue was negatively impacted by devaluation of the Mexican Peso and Brazilian Real and lower volume, adverse product and channel mix and incremental expenses driven by the COVID 19 pandemic.
3	ABInBev	Europe, Americas, Asia Pacific, Africa	Alcoholic/non-alcoholic beer, Soft drink	41,255	23,977	-8.2%	Revenue decline is attributed COVID-19 restrictions and resulting in a shift from the on-premises channel to the off-premises channel in different markets, impacting our top-line.
4	Diageo	North America, Europe, Turkey, Africa, Latin America, Caribbean, Asia Pacific	Alcoholic beverages, Spirits, Beer, Wine	20,174.58	1613.1	-56.4%	In the first half of the year Diageo delivered good, consistent results, with broad based organic net sales growth across regions and categories. However, the second half was characterized % decline in organic operating profit due to decline in volumes, cost inflation and unabsorbed fixed costs.
5	Royal Unibrew	Western Europe, Baltic Sea	Beer, Malt, Soft drinks, Water, Cider	7,557	1,198	4.5%	Revenue was negatively impacted by COVID-19 in the Western Europe and Baltic Sea segment, whereas the international segment was able to grow 6% organically.
6	Campari Group	Americas, Europe, Africa	Spirits, Wines, Soft drinks	2,246.9	187.9	-39.1%	COVID 19 pandemic and ensuing governmental restrictive measures as well as new trends in customer behavior
7	Pernod Ricard	Africa, Middle East, Europe, Asia Pacific, Americas	Wine, Spirits	8,448	1,439	-13%	In 2015, Pernod Ricard embraced a consumer-centric approach. In 2017, segmentation was reorganized by product category to adopt a strategy structured around moments of consumption, or conviviality experiences. These strategies have allowed the company to successfully adapt to the constantly changing consumer landscape. This was accelerated by the pandemic
8	Olvi Group	Europe, North America, Asia, Africa, Australia	Beer, cider, long drinks, spirits, water, soft drinks, energy drinks, sports drinks, wellness product categories	414.9	40.1	9.9%	Olvi Group's sales volume, net sales and operating profit for 2020 made all-time highs for the fifth year in a row, in spite of the corona pandemic

Figure 13 – Company Overview

5.2 Sensing

Due to the uncertain and unpredictable nature of exogenous shocks, the capability of organizations to continuously scan their environment to properly detect such events as early as possible is very important. By sensing, organizations can position themselves to better absorb the shocks that follow the impacts of the exogenous shock. Being able to sense and thereafter taking advantage of the information acquired would require the organization being viable and agile.

1 As per the report of Carlsberg, *as early as January 2020, they started putting in place steps to reduce costs* (Carlsberg Annual Report, p.7). Not fully sure of what the impact of the pandemic was going to be, they r*educed the production planning cycle from one month to 1-2 weeks and the number of SKUs to increase flexibility in the light of unpredictable supply and demand* (Carlsberg Annual Report, p.7). This, they mentioned, led to a more precise focus on the things that they believed were important at the moment. From their annual report, they indicate their actions leading to significant cost reductions during the financial year. Savings that they made included that from their "*professional services, travel, entertainment, people and marketing spend. Some savings will be permanent, while others, including marketing, will not.* Their *many actions limited the organic decline in operating profit to 3.5%"* (Carlsberg Annual Report, p.7) (Calsberg, 2020).

2 In the case of Heineken, the CEO in their report talks about how their agile and resilient supply chain enabled them to react quickly to mitigate the impact of the pandemic. The report purports that "*risks are identified, mitigated and monitored on an ongoing basis as part of their business routine"* (Heineken Annual Report, 2020, p. 24). Heineken can therefore be said to have been utilizing their sensing capability even before the impact of the coronavirus. Some of the quick decisions the company made was in an attempt to safeguard the continuity of their business. This included decisions around cost mitigation and cash preservation to protect their future (Heineken Annual Report, 2020, p. 24). (Heineken, 2020)

3 Anheuser-Busch InBev anticipated the effects that the pandemic would have on its smallholder farmers who are very integral in their supply chain and made sure they kept their programs still running (Anheuser-Busch InBev Annual Report, 2020 p.). This was to make sure that the farmers still had access to all the needed inputs and support as well as a reliable market to sell their produce. The company also assessed how the supply chain had been impacted by the pandemic and the ability of their programs to respond to the challenges that resulted from it. By sensing the impact that the pandemic would have on consumer behavior, Anheuser-Busch InBev proceeded to adopt e-commerce channels and also found new ways to connect with the actors in their supply chain. This reaction to the pandemic, according to their report, allowed the company to deliver beer volume growth of 2.2% by the second half of 2020 despite the corona situation still remaining extremely unpredictable (Anheuser-Busch InBev Annual Report, 2020, p.3).

4 From Diageo's report, they mention the embeddedness of a risk managing structure in their operations (Diageo Annual Report, 2020, p.38). As part of the company's measures to detect risks in their environment in whatever form, they perform annual risk assessments and establish mitigation plans on a continual basis. An Executive Audit and Risk Committee is in charge of the company's risks assessments and reviews. These regular assessments can be linked to the good consistent set of results that the company achieved in the first half of 2020. However, organic net sales were down 8.4% for the full year driven by volume declines on the back of the recent and sudden contraction of the total beverage alcohol industry (Diageo Annual Report, 2020, p.44).

5 Pernod Ricard's report highlights the importance of agility and anticipation in adapting to exogenous shocks. The company already had a 'Transform and Accelerate' Strategic plan in place prior to the pandemic hitting (Pernod Ricard Annual Report, 2020, p. 26). By leveraging on its strategic plan, the company was able to take early actions to mitigate the impacts of the pandemic to its supply chain. Adapting quickly to the impacts of the coronavirus pandemic was made easier for the group due to their agility. Pernod Ricard also showcased visibility by sharing knowledge through various means including newsletters, videos, webinars and online platforms with its various actors in the supply chain. This collaborative approach, according to their report, enabled them to predict how people socialize, entertain and consume their products. The presence of the company's Cultural Foresight Centre of Excellence allowed the company to quickly analyze the impacts of the pandemic and align its strategic plans to the current trends (Pernod Ricard Annual Report, 2020 p. 61).

6 A look at the report of Royal Unibrew also draws a similar picture to the others. They have in place a risk management approach to help deal with uncertainties that may arise from the business or external environment. Royal Unibrew has a deep-rooted risk culture (Royal Unibrew Annual Report, 2020, p.38) where local as well as central risk owners from the various group functions are appointed to facilitate the risk identification, control and mitigation. However, the company admits to limited visibility during the pandemic. With all the uncertainties surrounding the pandemic and the lack of adequate information about the virus, the company had to adopt clear guiding principles for decision making (Royal

Unibrew Annual Report, 2020, p.11). Per the report, the impact of the coronavirus pandemic was severe on the on-trade business of the company. However, Royal Unibrew was still able to achieve satisfactory results and increase market shares due mainly to their agile supply chain. This reiterates the importance of the drivers to the adaptability of the supply chains. The viability and agility of the supply chain enabled the company to succeed in obtaining better financial results than the previous year. (Unibrew, 2020)

7 Campari Group also has a risk management system in place which is aimed at identifying, assessing, managing and monitoring potential events or situations that could potentially affect their supply chain ((Campari Group, Annual Report, 2020, p. 71). Just like the other organizations, Campari Group leveraged on their agile supply chain in a challenging and volatile year, to achieve satisfactory overall results. The organization's state-of-the-art and fully integrated supply chain across the globe, allowed for a quick reaction to the pandemic (Campari Group, Annual Report, 2020, p. 59). Visibility in the supply chain was important in this instance to ensure flow of information throughout the chain. (Campari, 2020)

8 Last but not the least is the Olvi Group. Unlike the other companies discussed earlier, Olvi group's report (Olvi Group, Annu was not very detailed on what they did in relation to preparing for or anticipating the pandemic. However, like the others, they also had in place a risk management strategy as part of their day-to-day operations. After the pandemic hit, Olvi Group's management were compelled to meet weekly in order to continuously monitor the situation, update forecasts and continuity plans in line with the pandemic (Olvi Group,

Annual Report, 2020, p.41). Their plan is to better understand the impact to their operations and better develop their risk management for the future. (Olvi, 2020)

From the reports of these companies, one thing that runs through is the presence of a risk management strategy that is meant to enable the business to scan its environment for exogenous shocks that might have an impact on the supply chain. Also, the importance of the drivers towards the supply chain adaptability is highlighted. Having the capability to sense alone is not sufficient for adaptation. The organization still needs to be agile and viable whilst making sure that information and knowledge is shared among all actors of the supply chain.

5.3 Seizing

The aftermath of an exogenous event is always a crucial phase in the survivability of an organization. How the organization reacts to the impact will determine whether it can just cope during the event or if it can actually survive and bounce-back better than before. During this phase, the supply chain's agility and viability are very important if the organization is to identify and take advantage of opportunities as well as mitigate the continuous impact of the exogenous shock. Again, we look at the organization's reports to identify how they took advantage of the pandemic or whether they were overwhelmed by it.

1. The impact of the pandemic on Carlsberg's supply chain especially on their on-trade businesses was severe, just as with other companies as well (Carlsberg Annual Report, 2020). With all the restrictions and social distancing, traditional modes of sales to their on-

trade customers were no longer feasible. This necessitated different ways of doing business including developing on-line delivery and take-away platforms. Also, with the uncertainty and unpredictability of supply and demand, the company reduced the production planning cycle from one month to 1-2 weeks to help increase flexibility in the supply chain (Carlsberg Annual Report, 2020 p.7). According to the report, overall communication during the pandemic was strengthened and priorities reset and aligned with objectives across the supply chain. (Calsberg, 2020)

2. Anheuser-Busch InBev tapped into their agile capabilities to build cross functional teams to help quickly develop response and recovery initiatives during the pandemic. Agility enables the organization to quickly adapt parts of the supply chain that are needed in a bid to mitigate overall impacts of the pandemic (Anheuser-Busch InBev Annual Report, 2020). In addition, a series of digital programs that were aimed at supporting the company's supply chain actors get back on their feet was implemented in 20 countries (Anheuser-Busch InBev Annual Report, 2020, p.10). These prospects helped the organization to keep supporting its supply chain actors which ensured continuity of operations.

3. Just like Anheuser-Busch InBev, Diageo's report mentions support initiatives that the company implemented to help its supply chain actors whilst also ensuring business continuity. This support included a £2 million in funds to support on-trade staff in the United Kingdom, whilst in Nigeria, an initiative saw the company support bar owners and staff impacted by closures by providing care packages (Diageo Annual Report, 2020, p, 19). Any opportunity that would enable Diageo to support its supply chain actors was

quickly taken. In Latin America, an online platform to help customers make cocktails at home was developed. This platform was designed to provide customers with the bar experience in their various homes during the lockdown phase of the pandemic. As an integral part of the supply chain, this sought to keep customers' morale during the pandemic, still boosted all the while keeping the company's products in their minds.

4. Pernod Ricard's report highlights the prospects that were presented in off-premises, e-commerce, and cocktails-to-go business and how they leveraged on the pandemic to take advantage of the opportunities. A task force was put in place to help supply chain actors implement the latest guidance and best practices available. With the impact on on-trade businesses, the company ventured into the manufacturing and delivery of bottled cocktails (Pernod Ricard Annual Report, 2020, p. 11). Also, an accelerated digital transformation was necessitated as a means of marketing and selling to customers. Pernod Ricard implemented a comprehensive cost control and cash management program to help maintain the supply chain and support sales in their various markets (Pernod Ricard Annual Report, 2020 p. 61).

5. The impact to the on-trade business is one that seems to cut across all organizations in the alcoholic beverage industry. Royal Unibrew reports a similar impact to their on-trade business, however due to their close cooperation with their customers as well as their agile supply chain, they were able to direct their efforts towards the growing off-trade business (Royal Unibrew Annual Report 2020, p. 28). The agility of the organization enabled it to adjust to opportunities both commercially and across the supply chain. Also, the company

launched a B2B e-commerce platform for customers in Denmark as the pandemic had caused a global increase in the e-commerce usage (Royal Unibrew Annual Report 2020, p. 11). More short-term plans were implemented, and focus was also moved to the areas with positive returns like the off-trade businesses.

6. In the case of the Campari Group, the impact of the coronavirus pandemic presented an avenue for better collaboration across the supply base of the supply chain which led to a strengthening of strategic partnerships between the actors. This collaboration, according to their report, enabled the company to better support its suppliers in mitigating the impacts of the pandemic. Just like all the other organizations, the pandemic caused a shift to stronger digital marketing options. E-commerce channels and general online and digital platforms were focused on as a way of mitigating the effects of the restrictions on on-trade business (Campari Group Annual Report, 2020, p.11). The collaborations with the supply chain actors resulted in a strengthened distribution network which allows the organization to quickly identify emerging consumption trends in individual markets and to subsequently react quickly to the market's demand in a more timely and flexible manner.

7. Just like the other organizations, Heineken, and Olvi Group both also adapted to the use of more digital platforms and e-commerce for marketing (Heineken 2020, Olvi Group 2020). The impact on the on-trade business was severe. Digitization has been the best alternative for sales and marketing during the pandemic.

As is evident from the various reports, the seizing capability is very essential in keeping the organization's supply chain operational during a period of uncertainty and unpredictability. Taking advantage of whatever opportunity might present itself whilst also adapting the supply chain to the new reality is very important for survivability.

5.4 Transformation

An organization in the attempt to build an adaptable supply chain line must also possess the ability to enhance, combine, protect, and most importantly reconfigure its tangible and intangible assets to survive uncertainties when faced with one. Transforming as a capability which also enables a firm to maintain its external fitness and is concomitant with Sensing and Seizing. At this stage, the analysis will take into consideration any activities of the various MNEs which involve recombining and reconfiguring of firm assets and structures to stay adaptive.

1. The Carlsberg group undertook activities according to their ESG report which indicated signs of them transforming in order to adapt to the coronavirus pandemic. A statement from their CEO had a quote supporting their transforming capabilities that, "*This year, we increased our support for local communities – including the hard-hit hospitality industry – and transformed production lines to help meet unprecedented demand for hand sanitizers"* (Carlsberg ESG Report, 2020 p.3). Their ability to transform the production line by reconfiguring it to produce an item which wasn't initially made by the organizations supports the idea of transforming and viability capabilities. Sanitizers were not a product of the Carlsberg group prior to the pandemic but they had to enhance and reconfigure their

tangible assets to support the local communities. Also, by restructuring their production line indicates the viability as a driving force within their supply chain.

2. Heineken in their report and from their website also made mention of activities which indicated signs of reconfiguring in their business model. From their website, they made mention of using organizational resources to produce sanitizers, indicating that they have an outstanding supply chain ability to support that. This was quoted as, *"Using our very own spent alcohol, we decided to bring hand sanitizer and surface cleaner to front-line workers in need by taking advantage of our world-class manufacture, supply chains and logistics abilities"* (Heineken, 2020, Our Response to COVID-19). Moreover, they mentioned in their ESG report that their agile way of working allowed for a flexible and speedy supply chain management. The development of business intelligence and sharing it amongst teams within the firm to inform them of near-real time activities supports visibility as a driver of supply chain adaptation (Heineken, 2020).

3. Anheuser-Busch InBev stated clearly as to how they transformed by reconfiguring supply chain activities to adapt to the coronavirus pandemic. They restructured their production lines to produce sanitizers and switched their tangible assets (sales products) into an intangible one (innovative initiatives) to support their customers and business in their supply chain. Moreover, they mention that their ability to quickly develop response and recovery initiatives was due to their agile cross functional team supported by their digital programs (i.e., visibility) which helped to support their partners in more than 20 countries. From their report it was quoted as follows; *"Our breweries moved from brewing beers to*

producing hand sanitizers; we utilized our distribution networks to deliver masks instead of kegs…; our sales teams went from supplying product to bars and restaurants to launching innovative initiatives to keep these vital businesses alive; and we used our marketing capabilities to drive public awareness and generate donations. (p. 73*)"* (ABInBev, 2020) & (Report, 2020)

4. Diageo did the same as compared to the above listed MNEs. In their report, the CEO made mention of the restructuring of their production line to produce hand sanitizers which isn't the organization's original business production plan. It was quoted as *"At a time of acute personal protective equipment (PPE) shortages, we donated alcohol to make more than ten million bottles of hand sanitizer for frontline healthcare workers in 20 countries and manufactured hand sanitizer to meet community surges in demand".* Moreover, in Great Britain and Ireland when lockdowns took place, Diageo via Guinness announced its support to on-trade staff with over £2 millions in funds since they were in the front line to the pandemic within their supply chain. (Diageo, 2020)

5. Pernod Ricard also used some of its resources for production into protecting its employees and communities as well as supporting hospitality partners. They supplied alcohol and produced hand sanitizers which wasn't part of their production line but was done to support people during the pandemic. From their report it was mentioned that "*This same involvement also spurred our employees around the world to put their energy into supporting the severely affected cafe´, hotel and restaurant sector and our local communities: for example, by supplying millions of liters of pure alcohol and producing*

hand sanitizer.". They also touched on the fact that they had to put in place measures to make their SC more agile. Measures such as forecasting and updating (visibility) views on expected performance in the new Covid-19 environment. This aided them to leave local teams to make their own decision on how best to keep, cut or reallocate resources. (Ricard, 2020)

6. Royal Unibrew didn't follow the commonly seen transforming capabilities strategies implemented by the other MNEs within their industry which is producing sanitizers. They rather focused attention on enhancing their off-trade business since the on-trade business was highly affected by the pandemic. From their report it was quoted as *"The On-Trade business was highly impacted by the COVID-19 restrictions. However, due to the close cooperation with our customers as well as an agile organization and supply chain we succeeded to direct our efforts towards the growing Off-Trade business – resulting in satisfactory results and increasing market shares."*. The focus to reconfigure their supply chain from an impacted on-trade activities to an enhanced off-trade activity indicates how agile and viable they were. To support their off-trade activities, virtual events were held in the form of TV shows. "*The sales and supply teams responded quickly to support the growing Off-Trade business."*.

7. Looking at Olvi Group's report, it was made clear that they restructured their production line to produce items such as hand sanitizers which isn't part of the organization's original production plan. They acknowledged the fact that there was an increasing demand for

technical materials needed to produce hand sanitizers which was needed by the community due to the pandemic. A quote from their report was as follows, *"We decided to use our expertise and distillery for the production of disinfectants needed by everyone. Our employees were proud of their work and the product, which has played a key role during this serious crisis,"* according to Mikko Mykkänen, Master Distiller, CEO of The Helsinki Distilling Company. The company also opened an online store to support its online sales since the pandemic kept people at home. It continued its production investments by reconfiguring the production line to increase its production capacity of special beers, soft drinks as well as water. Moreover, visibility was key with regards to information sharing at the Olvi group.

8. Campari Group on the other hand diverted from the above-mentioned common strategy put in place by other MNEs in the alcoholic beverage industry, which was producing sanitizers. On the other hand, they enhanced their production line by joining forces with their supply base and led to a strengthening of strategic partnerships. This was quoted as *"The priorities in 2020 shifted to securing supply and maintaining the economic sustainability of our supply base. With enhanced supplier collaboration, Campari Group was able to support suppliers in mitigating the impacts of Covid-19 in a highly volatile environment."*. Also, the group enhanced its marketing and sales by shifting its attention to off-trade activities as well. "*Since the outbreak of the Covid-19 pandemic, the marketing activities of the Group have been reshaped with a strong focus on digital activations."*. The group's ability to reshape easily without much distress has given them a state-of-the-

art and fully integrated supply chain across the globe proving how agile and viable their supply chain is.

As per the above analysis, it can be noticed that all MNEs except for Royal Unibrew and Campari restructured their production line to produce hand sanitizers. This was mostly done to support the employees and communities since they were in high demand due to its shortage. Royal Unibrew on the other hand focused its attention on transforming its on-trade resources to the off-trade ones while Campari transformed its intangible assets into supporting its supply base.

Chapter 6: Discussion

From the extracted data, it is evident that MNEs experienced some disruptions and were negatively affected by the pandemic. Overall, the MNEs experienced a decline in revenue as compared to the previous year. This was due to a reduction of volume sold mainly because of disruption of on-trade sales. Also, even though only Heineken incurred huge financial losses for the 2019/2020 financial year, six out of the eight companies experienced a decline in their profits and only two MNEs experienced an increase. Royal Unibrew and Olvi Group were the two MNEs that made more profits as compared to their figures from the previous year.

According to the Royal Unibrew Annual Report (2020), the company benefited from their large portfolio of low sugar products and sales from the Baltic region where the impacts of the pandemic were experienced at a later stage as well as to lesser degree as compared to the rest of the world. Also, Olvi Group reached an all-time high in sales volumes due to increase in sales from Lithuania,

Finland and Belarus. However, their information provided online from various sources did not provide enough information to deduce how this came about. It should be noted though that the company sources all materials locally in the countries where production takes place (Estonia, Latvia, Lithuania, Finland and Belarus).

All the assessed MNEs had in place risk management strategies that seek to regularly assess the business environment for threats that would impact the operations of the organization. This is important because as already mentioned MNEs are exposed to more risks and uncertainty. Both transaction cost and dynamic capabilities emphasis concepts of bounded rationality (Augier & Teece, 2009) and with transaction cost further including uncertainty. These allude to the fact that no matter what measures are in place there is no way that an MNE can predict and institute measures to mitigate all possible occurrences. This is more so important with exogenous shocks which can be unpredictable and originate from the external environment of the MNEs and which they have no control over. As seen during the pandemic, its effects were devastating because governments and MNEs were largely unprepared. When the pandemic began, no institution could have predicted that the ripple effects would be so terrible.

Again, according to the TC theory, flexibility is encouraged in situations of uncertainty (Klein, 1989). All MNEs mentioned in their 2020 annual report how short planning cycles and agility enabled them to adapt to changing customer trends.

Having *sensing* capabilities alone is not enough. It is important that MNEs not only continuously assess threats and opportunities in the environment but also have in place strategies to deduce what

opportunities and threats that are going to be presented and ensure that the information is available to the relevant actors. In an MNE or a GSC this is also referred to as supply chain visibility (Kalaiarasan, et al., 2020). It is the view of this paper therefore that visibility increases the seizing capabilities of a supply chain. In the study all 8 MNEs realized that the pandemic and accompanying governmental restrictions adversely affected their on-trade channels however, presented opportunities for their off-trade channels. They also realized that this presented the opportunity to utilize digital solutions to connect with their customers through online marketing campaigns and ecommerce.

Also, with the onset of the pandemic, personal protective equipment (PPE) was in short supply. MNEs realized the opportunity to connect with partners (customers and supply chain partners) through corporate social responsibility activities such as cash donations and donation of PPEs. This is in line with findings of (Fridgen, et al., 2015) that indicate that to reduce disruptions in the supply chain caused by exogenous shocks firms must support their supply chain partners.

An integral part of the adaptation process that supply chain managers need to focus more on is what was conceptualized as drivers to supply chain adaptability. Agility, for example, was identified by most of the organizations as being the reason why they were able to absorb and withstand the shocks of the impact. Supply chain agility is therefore an important ability for supply chains to have in events of exogenous shocks. Also, the viability of the supply chain cannot be overlooked. The ability to withstand the shocks of exogenous events without having to halt operations is essential if the organization is to be able to seize opportunities that arise from exogenous shocks. With the uncertainty that characterizes exogenous shocks, the sharing of

information, knowledge and experience among supply chain actors seem to be very important for supply chain adaptation. Visibility between supply chain actors is integral for trust.

Chapter 8: Conclusion

For an organization to be considered as having an adaptable supply chain, it must be able to withstand the impacts of exogenous shock to operate into the foreseeable future. TC theory, RBV theory and DC theory (RBV extension) are known theoretical lenses to study SC adaptation and firm survivability in general. They were common theories utilized by firms which underwent extreme disruptions as a reaction to the corona pandemic in SCs management. However, the literature on TC, RBV and DC on the adaptation strategies is still very fragmented, little has been done to indicate existing practices or strategies pertaining to SC adaptation.

In this study, we analyzed various literature and identified some general characteristics of the adaptation strategies used by companies during uncertain events. We then analyzed 8 MNEs in the European alcoholic beverage industries to position and later generalize the existing research efforts in a practical context. Our study emerged with a framework composed of 3 key elements within the dynamic capabilities' theory: *sensing* (anticipating shocks before they surface), *seizing* (capturing opportunities during times of uncertain events) and *transforming* (enhancing, protecting, and reconfiguring) its assets and structures. These strategies have been incorporated by firms to achieve SC adaptability under the conditions of the COVID-19 pandemic. Moreover, the commonalities within the literature indicated certain key factors which we considered as drivers

of the supply chain. They were identified as *viability* (structural redesigning), *visibility* (timely and accurate information dissemination) and *agility* (quick and effective responses).

We then showed that these drivers of SC support the three elements by creating an integrated framework of SC adaptation that encompasses the entire SC ecosystem, network, and resources. These will then enable an organization to adapt well enough not just to bounce back but to also bounce forward from a potential crisis. An organization possessing these elements of dynamic capabilities coupled with the aforementioned drivers which supports a supply chain to be adaptable should be able to sustain and leverage themselves during exogenous shocks. Most importantly the organization should be able to gain competitive advantage since that is an aim of most organizations.

From the analysis, we observe that most of the MNEs' activities support the measures and insights of the framework in adapting to exogenous shocks. All 8 MNEs had risk management strategies which enabled them to anticipate and scan the environment for shocks before they surface. They also took advantage of the opportunities presented to them via the pandemic's impact by modifying or restructuring their business model or production lines to gain some advantage. Therefore, we concluded that for European MNEs to adapt their SC to exogenous shocks, sensing, seizing, and transforming coupled with the support from the drivers of SC (viability, visibility, and agility) must be implemented or practiced.

Finally, we discussed future research directions that may be of value for researchers, companies, and practitioners alike in developing and testing new models for SC adaptation under pandemic and pandemic-like conditions.

Chapter 9 Limitation and Further Research

There are a couple of limitations that can be noticed in the research paper. To begin with, the assessment of the conceptual framework was done based on the netnographics of various companies. Also, for further empiricism, primary data from the companies should be inculcated for stronger scrutiny and analysis of the framework. A thematic literature review has been adopted due to the complexities associated with the research topic especially due to its newness and the time constraint placed on it. Moreover, a systematic literature review should be employed in future studies for deeper understanding of the research topic. This would perhaps introduce other themes and new thoughts to improve the framework. Finally, the major section of the data analysis was structured and pre-determined according to our developed themes and concepts. As a result, the analysis of the companies was also structured around the themes and concepts developed which may have perhaps eroded the opportunity to discover new or already existing ones which were beyond our literature themes or determinants of supply chain adaptation.

Moreover, the research topic is common among supply chain management literature, however, due to the current ongoing coronavirus pandemic, the topic keeps growing more than ever. The impact of the pandemic on MNEs has drawn attention to how essential it is to have an adaptable supply chain to overcome uncertainties. The world is becoming more globalized than it was yesterday increasing the chances of risk spreading easily and faster than before. As a result, this provides a basis for further research on the topic. Moreover, the decision to consider further research on the topic is mostly to create the best general conceptual framework which will function beyond MNEs in the alcoholic beverage industry. As mentioned earlier, the creation and analysis process of the framework was based on the literature review and was tested using the secondary data of various

MNEs. To enable us to find missing elements or themes and perhaps modify our framework where necessary, further research should be conducted to enhance the validity and reliability of the framework preferably with primary data.

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	Title	Author	Research Question(s)	Conceptualization/theory	Methodology	Data/Context	Findings	Suggestions for further research	Themes in the literature
Article 1	Predicting the impacts of epidem	Dmitry Ivanov	1. What is the impact of the e	An analysis for observing and pre	Simulation-based me	Hypothetical data	The major observation fro	In future research, we are going to test th	Supply chain, Risk management
Article 2	A production recovery plan in ma	Sanjoy Kumar Paul, Priya	1. How can manufacturers m	Increase in production capacity a	Develop a constraine	Hypothetical data	By applying the recovery s	Future studies may consider collecting re	Recovery plan, Mathematical m
Article 3	Production Logistics Visibility – F	Ravi KALAIARASAN, Jan	Analyse and discuss the spec	(1) intra-site real-time visualisatio	According to the findi	Hypothetical data	It is concluded that visibilit	To further explore intra-site visibility for m	Digitalization, Production logistic
Article 4	Supply Chain Viability and the C	Dmitry Ivanov	We address this gap and eng	According to our generalisation, S	Mixing literature anal	Multiple case studies	Our study emerged with a	(1) Analytical derivation of adaptation fun	Supply chain dynamics; supply c
Article 5	Corona virus, tariffs, trade wars a	Robert B. Handfield, Gary	Through two case studies the	Using the constructal law of physi	The authors apply the	Interview findings wit	Adopting the approach of	Further research could transfer the ideas	Tariffs, Global supply chain, Disr
Article 6	The challenges and opportunitie	Yipeng Liu, Jong Min Lee,	Exploring the experiences an	Articulate the importance of resili	Qualitative Research	Secondary data from	COVID-19 has accelerate	There must also be a call for the develop	COVID-19 · Global health crisis
Article 7	Supply chain agility, adaptability	Rameshwar Dubey, Nezih	The purpose of this paper is t	The contribution lies in: providing	The current study util	Cross-sectional elect	The statistical analyses su	(1) investigate other resources and capat	Survey, Resource-based view, S
Article 8	Agility index in the supply chain	Ching-Torng Lin, Hero Chi	How to measure and improve	Measuring agility and identifying t	Qualitative Research	Survey and study the	(1) The model can provide	Further research is necessary to fine tun	Agile, supply chain, Agility index
Article 9	Research opportunities in prepar	ManMohan S. Sodhi, Chris	Operations management (OM	A research agenda and opportuni	Qualitative Research	Secondary data from	Overall, managing supply	we hope that the research agenda in this	Pandemic, global supply chains,
Article 10	Impact of COVID-19 on Logistics	Sube Singh, Ramesh Kum	Investigate COVID- 19 situatio	A simulation model of the public d	Simulation-based me	Hypothetical data	The adoption of a truck-dri	A detailed model of public distribution net	Supply chain disruption; supply c
Article 11	A production recovery plan in ma	Paul, Sanjoy Kumar · Choo	(1) How can manufacturers m	This research supplements the in	The authors use a ma	Hypothetical data	The result shows that the	developed recovery model is capable of re	Recovery plan, Mathematical m
Article 12	An empirical analysis of supply c	Jorn-Henrik Thun & Daniel	Relevance ofdifferent risks in	Analyze the status quo of supply	Qualitative Research	Questionnaires given	Reactive supply chain mar	Further research could transfer the ideas	Supply chain managementRisk
Article 13	Pandemics and Supply Chain Ma	Christopher W. Craighead,	Which theories are best for ac	An agenda for supply chain mana	Qualitative Research	Hypothetical data	we outlined a series of the	In thinking beyond the context of pandem	Supply Chain, Pandemics and S
Article 14	Impacts of epidemic outbreaks o	Maciel M. Queiroz, Dmitry	How does the OSCM literatur	A systematic analysis of the impa	Qualitative Research	N/A	the interplay between SCs	In future, one promising research avenue	Supply chain · COVID-19 · Influe
Article 15	Can supply chain risk manageme	Jamal El Baz and Salomee	RQ1. Do COVID-19 disruptior	In this paper, we empirically inves	Qualitative Research	survey data from 470	the mediating role of SCR	future research might investigate the outc	Disruption impacts Supply chain
Article 16	Antecedents and consequences	Jie Yang, Hongming Xie, G	(1) Are a firm's supply chain c	This study evaluates the antecede	Mixed Method	online survey	Our findings indicate the fi	To further evaluate the factors of develop	Disruption orientation; impact; vi
Article 17	Information-sharing in supply cha	Riikka Kaipia, Helena Lake	how can incremental visibility	This research was carried out in c	Qualitative Research	netnogrpahics - onlin	Visibility, as such, does no	In further research case studies should b	Logistics, supply chain manage
Article 18	Improving supply chain performa	Paul A. Bartlett, Denyse M	(1) Identify and select a case	This paper seeks to investigate th	Qualitative Research	netnogrpahics - onlin	The supply chain's perforn	Future work could be to provide a more g	Supply chain management, Join
Article 19	Reconfigurable Supply Chain: Th	Alexandre Dolgui, Dmitry I	RQ1. What is the state-of-the	We hypothesize that reconfigurati	Abductive approach	N/A	The state-of-the-art throu	Integrating these two sides, e.g., how to	Supply chain management; Sup
Article 20	Big data and predictive analytics	Angappa GunasekaranTha	Whats is the role of infor matic	This paper draws on resource-ba	Qualitative Research	Survey based approa	Thefindings suggest thatc	The impact of data analytics on BDPA co	Big dataAssimilationRoutinizatio
Article 21	Pandemics and Supply Chain Ma	Christopher W. Craighead,	Which theories are best for ac	An agenda for supply chain mana	Qualitative Research	Hypothetical data	we outlined a series of the	In thinking beyond the context of pandem	Supply Chain, Pandemics and S
Article 22	Adaptation of theories of supply c	Manzouri, M., & Rahman,	N/A	this paper plans to explore to wha	Qualitative Research	N/A	Resource dependent, gam	Need to adapt these principles to SCM th	SCM theories; lean manufacturi
Article 23	Corona virus, tariffs, trade wars a	Robert B. Handfield, Gary	Through two case studies the	Using the constructal law of physi	The authors apply the	Interview findings wit	Adopting the approach of	Further research could transfer the ideas	Tariffs, Global supply chain, Disr
Article 24	Impacts of epidemic outbreaks o	Maciel M. Queiroz, Dmitry	How does the OSCM literatur	A systematic analysis of the impa	Qualitative Research	N/A	the interplay between SCs	In future, one promising research avenue	Supply chain · COVID-19 · Influe
Article 25	Supply chain risk in turbulent env	Trkman, P., & McCormack,	N/A	suggests a framework for the assessment of supplier risk of disruption based			Enables the estimation of	A further conceptual extension of the con	Supply chain risk managementT
Article 26	usiness model adaptation in resp	Corbo, L., Pirolo, L., & Roc	What is the role of networks i	Explores how the business model	Longitudinal analysis	Archival Data	new relevant business mo	explore the role that such pioneering firm	Business models, adaptation, sh
Article 27	Global value chains (GVC) and s	Villa Rodríguez, A. O.	How do smallholder farmers	display competence in the commur	Case study	Interviews and questi	The study gathers empiric	the purpose learning such as cooperative	Global supply chain, social learn
Article 28	Supply Chains and the COVID-1	Magableh, G. M.	What are the factors that affe	The study integrates different eler	Qualitative Research	Cross-sectional elect	SCC19 frames the essenti	Extend the literature review to include ne	Supply chain; COVID-19 pander
Article 29	The benefits of supply chain visit	Caridi, M., Moretto, A., Per	The first sub-goal was to deve	the paper provides a structured m	Focus group and Cas	Interviews and questi	the paper provides a struc	First, the tools should be extended by de	Supply Chain ManagementSupp
Article 30	Leveraging supply chain visibility	Williams, B. D., Roh, J., To	How does visibility and and in	explains how visibility and interna	Survey	Cross-sectional elect	internal integration is the r	examine the direct and interacting effects	Supply chain visibility Internal in

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	Title	Author	Research Question(s)	Conceptualization/theory	Methodology	Data/Context	Findings	Suggestions for further research	Themes in the literature
Article 30	Leveraging supply chain visibility	Williams, B. D., Roh, J., To	How does visibility and and in	explains how visibility and interna	Survey	Cross-sectional elect	internal integration is the r	examine the direct and interacting effects	Supply chain visibility Internal in
Article 31	Impact of COVID-19 on Logistics	Sube Singh, Ramesh Kum	Investigate COVID- 19 situatio	A simulation model of the public d	Simulation-based me	Hypothetical data	The adoption of a truck-dri	A detailed model of public distribution net	Supply chain disruption; supply c
Article 32	Knowledge as a strategic resour	Hult, G. T. M., Ketchen Jr,	how does the confluence of k	develop ideal knowledge profiles	Quantitative research	sample data from 91	findings lend support to th	examine the optimal co-alignment, interre	Marketing/operations interface C
Article 33	Antecedents of supply chain visit	Barratt, M., & Oke, A.	what are the antecedents of d	identify organizational resources	exploratory theory-bu	Case study	find that not all technologi	the relationship between distinctive visibi	Supply chain management, Visit
Article 34	A multi-structural framework for a	Ivanov, D., Sokolov, B., & K	N/A	propose a multi-structural framew	theoretically based or	Hypothetical data	multi-structural and inter-d	focus on further investigation into structu	Supply chain management, Ada
Article 35	A new introduction to supply cha	Janvier-James, A. M.	What entails supply chain ma	This paper seeks to introduce Su	Qualitative Research	refereed academic ar	it is crucial to understand t	Further research on the literature needed	Supply chain, Supply Chain Mar
Article 36	Supply chain design and analysi	Beamon, B. M.	Are the existing performance	to provide a focused review of lite	Qualitative Research	Hypothetical data	supply chain is defined as	classification of supply chain systems to a	Supply chain, Production, Distrit
Article 37	Supply chain modeling: past, pre	Min, H., & Zhou, G.	What are some of the key sup	this paper synthesizes past suppl	Qualitative Research	Hypothetical data	identifies key challenges a	The application of traditional mathematic	Supply chain, Analytical models,
Article 38	Understanding the concept of su	Ponomarov, S. Y., & Holco	What are the antecedents of s	present an integrated perspective	Qualitative Research	xtensive review of the	The key elements of suppl	Further conceptualization using different	Adaptability; Studies; Supply ch
Article 39	Supply chain evolution–theory, c	MacCarthy, B. L., Blome, C	What makes a supply chain li	The paper highlights and develop	Qualitative Research	Case study	identified six factors that a	a new science of supply chain evolution t	Supply Chain, Evolution, Life cy
Article 40	Dynamic capabilities and perform	Aslam, H., & Azhar, T. M.	Are Dynamic Capability relati	conceptualize dynamic capabilitie	survey	cross sectional surve	Results of our study show	Future studies may use secondary da	dynamic supply chain capabili
Article 41	Explicating dynamic	Teece, D. J.	What are the foundations of	Theoritical paper on Dynamic	Thematic analysis		The framework indicates	Future research should focus on refining	cospecialization, intangible asse
Article 42	Toward a dynamic capabilities	Barbara Kump, Alexander	Development of a 14-item	Based on the different theoritical	Quantitative	Electronic survey	DC scale met all	Extend scale. Sensing could be	dynamic capabilities; scale deve
Article 43	Dynamic Capabilities and	Ralf Wilden, Siegfried	1. The effect of dynamic	This paper develops and tests a	Quantitative using	Survey data and	Organic organizational	investigate potential mediating	dynamic capabilities, organizatic
Article 44	Dynamic Capabilities and the	Augier, Mie; Teece, David	1. What are the distinct and j	Dynamic capability	Qualitative	Describes the origins	Traditional RBV misidentif	The dynamic capabilities framework	strategy; organizational changes
Article 45	Reconfiguration, Restructuring	Stéphane J. G. Girod,	1. Organizational	Reconfiguration construct based	A quantitive method	A sample the top 50	The more pervasive	Consider multiple sources of disruptive cl	reorganization reconfiguration re
Article 46	Dynamic capabilities as	David J. Teece	1. A firm outsources activities	Dynamic Capabilities framework	N/A	extensive literature re	The systems theory and	The dynamic capabilities framework invit	dynamic capabilities
Article 47	Outsourcing from the	Lincoln Wolf de Almeida	1. A firm outsources	Transaction cost theory and	Qualitative multiple	This study consisted	Economic efficiency in	the study of a model that	Outsourcing. Transaction cost e
Article 48	A transaction cost approach to	Jill E. Hobbs	What are the foundations of d	Presents a framework from the	Quantitative using	Describes the	Identifying new opportuniti	Gather data from multiple respondents	Supply chain management verti
Article 49	The impact of dynamic	Šarūnas Nedzinskas ,	1. SME dynamic capabilities	Analysis of SME using dynamic	A quantitative survey	Study was carried	Findings suggest that	Investigate the interaction between	dynamic capabilities organizatio
Article 50	Global supply chain risk	Ila Manuj, John T.	The purpose of this paper is	Developed a model of global	Grounded theory	extensive literature	Speed and frequency	Future research should focus on refining	risk management, supply chain
Article 51	Towards an integrated	Yang Yang, Fu Jia,	A systematically review of	Supply chain learning	Thematic analysis	A systematic	This paper identifies and	Explore how the SCL process can be	Supply chain management , Env
Article 52	Dynamic Capabilities in Supply	Ignas Masteika, Jonas	Development of a 14-item sca	Dynamic Capabilities framework	Quantitative	N/A	The term uncertainty is us	The dynamic capabilities framework invit	Dynamic capabilitiesSupply chai
Article 53	Supply chain agility,	Dubey, R., Altay, N.,	Examine when and how	Resource-based view (RBV)	Quantitative	A cross-sectional	Information sharing and	Gather data from multiple respondents	Survey, Resource-based view, S
Article 54	The performance impact of	Michael Henke,	1. What are the distinct and	Dynamic capabilities view	Quantitative using	Based on a sample	Supply chain agility and	Further research is needed to validate	supply chain agility, supply chair
Article 55	Dynamic capabilities and	David J. Teece, Gary	1. Organizational restructurin	Presents a framework from the ec	Quantitative	Describes the origins	Identifying new	The dynamic capabilities framework invit	competences; capabilities; innov
Article 56	DYNAMIC CAPABILITIES:	KATHLEEN M.	Dynamic capabilities are a	Dynamic capabilities and the	Explorative study	N/A	Traditional RBV	Consider multiple sources of disruptive cl	dynamic capabilities; competitive
Article 57	Transaction Costs in Global	Philipp BREMEN, Josef	Analyze the cause-and-effect	Asset specifity and uncertainty	Explorative	Three companies	Unexpected transaction	Future research should focus on refining	Transaction cost economics, Op
Article 58	Investigation of exogenous	Fridgen, G., Stepanek,	Analyse and quantify the	Model focuses on the	Petri Net-based	Modeling was done	To reduce disruptions	Investigate appropriate integrated	supply chain, supply network, P
Article 59	MNC strategies, exogenous	Edmund Prater	What are the different types	Exogenous shocks and global	Quantitative	U.S.-based MNCs	The term uncertainty is	Consider multiple sources of disruptive	Supply chain management, unc
Article 60	The organizational antecedents	Michael J.Braunscheidela	This research investigates	Management of disruption risk in	Quantitative- survey	Survey was	Organizational practices,	Develop methods for proactively	Supply chain management Agilit

Appendix 2